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**FOREIGN
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JPRS Report

Nuclear Developments

Nuclear Development

JPRS-TND-90-008

CONTENTS

29 APRIL 1990

SUB-SAHARAN AFRICA

SOUTH AFRICA

- Koeberg Nuclear Plant Tests 'Entirely Satisfactory' [SAPA] 1

ZIMBABWE

- Uranium Potential Still Being Studied [THE HERALD 21 Feb] 1

CHINA

- Daya Bay Nuclear Plant Receives Adequate Funding [ZHONGGUO XINWEN SHE] 2
 Roundup Views Nuclear Power as Supplement
 [RENMIN RIBAO OVERSEAS EDITION 26 Mar] 2
 Daya Bay Nuclear Power Plant Nears Completion [XINHUA] 3
 Profile of Nuclear Chemist Wang Dexi [XINHUA] 3

EAST ASIA

NORTH KOREA

- Pyongyang Reportedly Smuggling Nuclear Know-How [Seoul CHOSON ILBO 3 Apr] 5

SOUTH KOREA

- Steps Urged To Counter North's Nuclear Threat [CHOSON ILBO 3 Apr] 5
 KEPSCO May Contract With USSR for Uranium [YONHAP] 6

EAST EUROPE

GERMAN DEMOCRATIC REPUBLIC

- Reduced Uranium Production, Health Threat Detailed [Bonn DIE WELT 23 Feb] 8
 Nuclear Safety Program Rife With Shortcomings [Duesseldorf VDI NACHRICHTEN 16 Feb] 9

LATIN AMERICA

ARGENTINA

- Official Denies Rumors of Nuclear Waste at Port [Buenos Aires Radio] 11
 Cavallo Proposes Nuclear Cooperation With EC [Madrid EFE] 11

BRAZIL

- Aramar To Receive \$40 Million in 1990 [O ESTADO DE SAO PAULO 9 Mar] 11
 Research Center Opens in Montes Claros [O ESTADO DE SAO PAULO 8 Mar] 11
 Activities of Ipero High Tech Park Described [O ESTADO DE SAO PAULO 8 Mar] 12
 Othon Reviews Successes of Naval Program [O ESTADO DE SAO PAULO 13 Mar] 12
 PRC Envoy Discusses Satellite Project Delays [O GLOBO 16 Mar] 15
 Scientists Request Role in Policy Formation [O GLOBO 15 Mar] 16
 LNLS To Acquire Permanent Site [FOLHA DE SAO PAULO 16 Mar] 16
 CNEN Rejects 'Interference' in Nuclear Program [Brasilia Radio] 17
 Navy To Develop Plant Project With IPEN [O GLOBO 11 Mar] 17

Santana Replaces Nazareth as CNEN Chief [O ESTADO DE SAO PAULO 22 Mar]	18
CNEN President Interviewed on Nuclear Policy [FOLHA DE SAO PAULO 16 Apr]	19
No Justification Seen in Not Signing NPT [O ESTADO DE SAO PAULO 25 Feb]	20

CUBA

Nuclear, Cultural Agreements Signed With India [Havana Radio]	22
---	----

NEAR EAST & SOUTH ASIA

INTERNATIONAL

Arab Union Finishes Meeting, Issue Statement [Baghdad INA]	23
Arab League Council Assails Anti-Iraq 'Campaign'	23
Meeting in Tunis [Kuwait KUNA]	23
More on Arab League's Reaction [Tunis Radio]	24
'Text' of Arab League Statement [INA]	24

EGYPT

Collective Stand Urged Against U.S., Israel [AL-AHALI 4 Apr]	25
Air Survey for Nuclear Power Raw Materials Planned [AL-AHRAM AL-DUWALI 7 Mar]	26

INDIA

Western Allegations on Pakistan Bomb Quoted [THE HINDU 19 Feb]	26
Nuclear Scientists Speak at Indian Science Congress [THE HINDU 9 Feb]	26

IRAN

Commentary on Iraq's Nuclear Efforts [Tehran TV]	27
Discovery of Triggers Called 'Propaganda Stunt' [JOMHURI-YE ESLAMI 5 Apr]	28

IRAQ

Industry Ministry Comments on Capacitors Incident [INA]	29
Saddam Comments on Binary Chemicals, Missiles [INA]	30
Right of Self-Defense Asserted at Arms Talks [INA]	33
Paper: Eliminate Israeli 'Nuclear Arsenal' [INA]	33
IAEA Inspectors Visit Nuclear Installations [INA]	34
Source Denies Alleged 'Heavy Weapons' Transfer [INA]	34

ISRAEL

Agency To Launch 'Huge' Satellite in Two Years [Jerusalem Radio]	34
--	----

LIBYA

Al-Qadhdhafi Calls for Arab Nuclear ICBM's [Tripoli TV]	34
---	----

WEST EUROPE

EUROPEAN AFFAIRS

European Parliament Urges Embargo Against Iraq [Hamburg DPA]	36
--	----

CANADA

Darlington Reactor Forced To Gear Down by Crack in Shaft [THE TORONTO STAR 16 Mar]	36
--	----

FEDERAL REPUBLIC OF GERMANY

Reprocessing Contracts Undergo Scrutiny in Bonn [HANDELSBLATT 2-3 Feb]	36
--	----

FINLAND

Soviets Reveal Spent Reactor Fuel Destination [HELSINGIN SANOMAT 2 Feb]	37
Animals Show No Nuclear Radiation Effects [HELSINGIN SANOMAT 22 Feb]	38

FRANCE

Nuclear Industry Assesses Safety Problems [Hamburg DIE ZEIT 9 Mar]	39
Military Sales to India Seen Endangered [LES ECHOS 23 Feb]	41

SPAIN

CSN Head Congressional Appearance	42
Plant Closing Urged [EL INDEPENDIENTE 22 Feb]	42
Antinuclear 'Euphoria' [EL INDEPENDIENTE 23 Feb]	43

TURKEY

Ministry Sees No Hostile Iraqi Missile Intent [ANATOLIA]	43
--	----

UNITED KINGDOM

Huge Cannon Components Seized	43
En Route to Iraq [PRESS ASSOCIATION]	43
Pipes or Gun? [PRESS ASSOCIATION]	44

SOUTH AFRICA

Koeberg Nuclear Plant Tests 'Entirely Satisfactory'

MB1104170890 Johannesburg SAPA in English
1704 GMT 11 Apr 90

[Text] Johannesburg April 11 SAPA—ESKOM [Electricity Supply Commission] recently concluded a series of periodic tests on various safety elements of its nuclear power plant at Koeberg in the Cape and found the results "entirely satisfactory".

A statement by ESKOM on Wednesday said several major tests were conducted, including those to check the aseismic bearings and reliability of the containment vessel.

The tests to check the integrity of the massive concrete structure housing the reactor ensured the structure was completely airtight.

"For the first time this pressure test, which must be undertaken every 10 years, was conducted by local personnel using local instrumentation...samples of the aseismic bearings, designed to prevent damage to the plant from earthquake activity, were also tested locally for the first time in conjunction with the University of Stellenbosch."

ESKOM said local industry was also responsible for designing and building the rig to test snubbers, the hydraulic supports of pipework and valves. This had eliminated the necessity of importing equipment.

"It is also essential that iodine is removed from effluent gases and filters are used for this purpose. Local industry designed and built to ESKOM's specifications equipment to measure the efficiency of these iodine filters.

"Such equipment, with the requisite sensitivity and accuracy, was previously not available in South Africa.

"These and other advances in local nuclear technology have resulted in extending the operational runs of Koeberg up to 224 days. This is equivalent to a motor vehicle running at 100 km/hour continuously for more than half-a-million kilometres.

"They have also enabled the radiation dose rate to which operating staff are exposed to be maintained at very low levels—in fact only Finland is lower than South Africa among those countries for which figures are known," ESKOM said.

ZIMBABWE

Uranium Potential Still Being Studied

34000127D Harare THE HERALD in English
21 Feb 90 p 1

[Excerpts] Sizeable deposits of uranium have been discovered in the Zambezi Valley and the explorers are developing cheaper production techniques to make a mining venture viable against low world market prices for the metal.

The resident manager of a West German company, Interuran, which has been exploring for the mineral over the past nine years, Mr Jean Rheiner, said yesterday in Harare that deposits of 2,000 to 3,000 tonnes had been discovered near Kanyemba and there were chances of discovering more.

However, he said, world market prices have gone down by nearly 80 percent in recent years. This meant that the Kanyemba prospect would not be developed as quickly as had been anticipated.

Most uranium is used in the generation of nuclear electric power although nuclear powers use small quantities of a rare isotope in bombs. The Zimbabwe deposits are in the form of uranium-vanadium ore at the Kanyemba prospects. [passage omitted]

Interuran, who are working with a Japanese statal authority, Power Reactor and Nuclear Fuel Development Corporation, is now developing a uranium and vanadium extraction technique called salt-roasting.

This will involve roasting the uranium-vanadium ore in temperatures of up to 850 degrees Celsius when vanadium becomes soluble and can be leached using water, while the remaining uranium can be recovered using smaller quantities of sulphuric acid, most of which is imported into Zimbabwe.

Salt and soda are added to the ore while it is being heated and this technique will be linked to the development of a salt plant in Botswana.

Exploitation of the Kanyemba prospect would mean an economic boom for this remote part of the Zambezi Valley. Mr Rheiner said the project would lead to the development of infrastructure in the depressed area and the employment of at least 300 people, most of them locals.

However, this would only be possible if world market prices for uranium swung upwards or Interuran successfully developed the cheaper production technique. [passage omitted]

"The euphoria (over the discovery of uranium in the Zambezi Valley) has dissipated because of events of the last few months. We are now waiting to see what further developments take place," Mr Rheiner said.

However, he said despite the difficulties ahead, he was optimistic that things would soon change for the better and the Kanyemba prospect would be exploited. This optimism was reflected by the fact that Interuran was going ahead with its plans which included further prospecting for the mineral.

The mineral has been found in depths of up to 250 cm under the Karoo sandstones of the Zambezi Valley. These are sedimentary deposits laid down by water at least 200 million years ago.

Daya Bay Nuclear Plant Receives Adequate Funding

HK1104034190 Beijing ZHONGGUO XINWEN SHE
in Chinese 0830 GMT 8 Apr 90

[Report: "General Manager of Guangdong Nuclear Power Joint Venture Company Says Daya Bay Nuclear Power Plant Is Not Facing Shortage of Funds"]

[Text] Shenzhen, 8 Apr (ZHONGGUO XINWEN SHE)—On 7 April, Zan Yunlong, general manager of the Guangdong Nuclear Power Joint Venture Company, told the press here that with the great support of the state, the construction of the Daya Bay nuclear power plant is not facing any shortage of funds.

Zan Yunlong said: In the process of construction, the nuclear power project did need certain international financial support. His company made its first application for a commercial loan of \$200 million in 1988. Due to the influence of international "sanctions" against China, the plan for contracting the commercial loan with overseas financial institutions was temporarily shelved. In this period, the state gave \$100 million to support the nuclear power project, thus ensuring its normal development.

Zan Yunlong also revealed that in view of present developments, it is very likely that the Daya Bay nuclear power plant project will obtain another commercial loan in the near future.

The financial status of the nuclear power plant construction project has continued to remain normal so far. Zan Yunlong also said that the domestic policy for economic readjustment and rectification could only be favorable to the construction of the nuclear power plant, because the state can better transfer human and material resources to meet the construction needs of the plant. He expected that the nuclear power plant will be put into operation as scheduled in October 1992, and his company has no plans to move up the date.

Roundup Views Nuclear Power as Supplement

HK0404010590 Beijing RENMIN RIBAO OVERSEAS
EDITION in Chinese 26 Mar 90 p 3

["Roundup" by staff reporter Liu Xieyang: "Nuclear Power: An Important Supplementary Source of Energy in China"]

[Text] To take an active part in developing nuclear power industry has already become an important measure for China to find a solution to its problem of energy resources.

China's gross output of energy resources is comparatively high, but the per capita possessed volume is meager, with a great proportion of coal in its structure, while most of its hydropower is focused in Southwest China. The economically developed East China and the coastal regions are in grave shortage of energy resources,

while being far away from China's coal and hydroenergy bases. Developing nuclear power industry can be a very good solution to these difficulties.

China's nuclear industry was first founded in the 1950's. Nuclear reaction piles of various categories have been built through 30-years of hard work, with valuable experiences in control and operation accumulated. China has mastered the technologies of surveying and extracting uranium mines, uranium refining and processing, the manufacturing of fuel parts as well as treatment of combusted fuel, and boasts a number of technicians armed with resourceful professional knowledge, and basic capabilities for research, design, and manufacturing of some apparatus and equipment. Qinshan Nuclear Power Station located in Hangzhou Bay, Zhejiang is of China's own research, design, and construction; it is estimated to be completed within this year. The generating capacity of the first-phase project of this nuclear power station will be 300,000 kw. Under the guidance of the State Nuclear Safety Administration, its safety and, counter-earthquake design, fire, flood, and moisture-proof shields, and console protection have undergone double-check in key links, and met requirements. Hans Blix, Director General of the International Atomic Energy Agency (IAEA) inspected Qinshan Nuclear Power Station, and expressed satisfaction with this nuclear power station for attaching great importance on quality and safety.

Building of Daya Bay Nuclear Power Station, a joint venture with Chinese and foreign investment is stepped up. The large round safety shell that houses the nuclear reaction pile is already on the horizon, and the workshop's cement structure to install the No. 1 jet engine has long been completed, while the project of the workshop for the No. 2 jet engine is in full swing. This nuclear power station owns two generator sets, each with a generating capacity of 900,000 kw. It is estimated that the first generator set will start operating in October 1992, and the second generator set will do the same nine months later. All equipment and design of this large-type nuclear power station are imported, and up to the advanced level of the 1980's.

The completion of these two nuclear power stations will not only relax the strained situation of power supply in Zhejiang and Guangdong, but will also accumulate practical experiences for China to develop its nuclear power industry.

The advantages of developing nuclear power are manifold, but it is necessary to possess certain conditions, and to base on China's actual conditions.

Nuclear power industry involves intensive investment, technology, and equipment with a long period for building. According to the calculation of relevant departments, the spendings on capital construction for a nuclear power station double those of a thermal one at the initial stage of China's nuclear power industry.

A nuclear power station involves complicated technology with very strict requirements. It involves many trades in the metallurgical, chemical industrial, and machine building industry and various branches of science and technology aside from the nuclear industrial system. The process from extraction, and enrichment of uranium to the building and operation of a nuclear power station, and the disposal of nuclear waste is one of applying complicated high technology, and calls for close cooperation and meticulous construction.

China is a developing country. Its financial resources, foreign exchange reserve, and technological level are limited. Therefore, it can only act according to its capability, develop the industry in an active way, and make steady progress.

China's Ministry of Energy Resources has already formulated the principle and plan for developing nuclear energy; and the general requirement is to master the technology of building nuclear power station as quickly as possible to create conditions for faster development of nuclear power after 2000. Before 2000, the main task is to master the design of a nuclear power project, equipment manufacturing, and the construction and operational technologies of a nuclear power station, to basically realize China's own design and equipment of a nuclear power station with a generating capacity of 600,000 kw., and to lay down a sound groundwork for its accelerated development early in the next century. Aside from building the first, second, and third-phase projects of the Qinshan Nuclear Power Station, nuclear power stations are planned for in the coastal regions in short supply of power.

The current task is to implement assignments in the plan on the one hand; on the other, to take a firm grasp of the building of the two existing nuclear power stations, and to earnestly absorb advanced experiences at home and abroad. It is necessary to adhere to the principle of invigorating the domestic economy and opening up to the outside world, and to realize the import of nuclear power generating set and its production by lot to cut back building cost.

On the issue of opening the channel of funds, the enthusiasm of both the Central, and local governments will be brought into full play. The eastern coastal regions and some provinces and cities in short supply of power have recently been very enthusiastic about collecting funds to build nuclear power stations. The principle of "building nuclear power industry with income derived from the industry" to set up a nuclear power building fund is sound in developing China's nuclear power.

Nuclear power is a high-tech industry; great stress should be laid on progress in science and technology. The spirit of import, digestion, development, and creating something new should be implemented, and the practice of adhering to combining the tackling of bottlenecks in scientific research with technological import. At the same time, it is necessary to formulate a plan for

bringing up qualified people for nuclear power to guarantee the needs of technology and administrative people in China's development of nuclear power.

Daya Bay Nuclear Power Plant Nears Completion

*OW1004141990 Beijing XINHUA in English
1324 GMT 10 Apr 90*

[Text] Shenzhen, April 10 (XINHUA)—Construction of the Guangdong nuclear power plant at Daya Bay has entered its most crucial phase.

The dome over the No. 1 reactor was completed last September. Manufacturing of the main equipment for the No. 1 generating unit was basically finished and about 80 percent of the manufacturing work for the No. 2 generating unit was completed at the end of March, according to a project official.

Preparations for the topping of the No. 2 reactor are well under way. The dome is scheduled to be completed in May, and the auxiliary projects will be finished at the end of the year, the official said.

The two generating units are scheduled to go into operation in 1992 and 1993 respectively, the official said.

Under the principles "safety first and top quality," the plant has established a complete monitoring system. [Word indistinct] and technicians attended special training courses before starting to work. Exhaustive safety tests have been performed to ensure that the quality of construction, equipment, and installation are up to international requirements.

The plant, China's largest nuclear power project, will have absorbed an investment of four billion U.S. dollars when complete. Its two units will have a combine generating capacity of 1.8 million kilowatts.

Profile of Nuclear Chemist Wang Dexi

*OW1604104690 Beijing XINHUA Domestic Service
in Chinese 0025 GMT 15 Apr 90*

[Text] Beijing, 15 Apr (XINHUA)—Wang Dexi, aged 77, is a member of one of the scientific divisions of the Chinese Academy of Sciences and a veteran scientist with the China National Nuclear Industry Corporation. He has been long devoted to the study of nuclear chemistry and has led and organized a number of defense research projects, contributing to China's national defense.

Wang Dexi comes from an intellectual family. Under his family's influence, he has, since his youth, aspired to serve and protect the country. After finishing middle school, he entered the Chemistry Department of Qinghua University, believing that chemistry would be of great benefit to the country. After graduation, he taught at Kunming Southwest United University. During his tenure there, he took the examination and qualified to study in the United States at public expense. He studied

at the Massachusetts Institute of Technology as a doctorate student. On receiving his doctorate degree, he was faced with the choice between returning to China and obtaining employment in the United States. Feeling that every man has a share of responsibility for the fate of his country, he decided to return home and, at the invitation of Nankai University, taught in its Chemistry Department.

On the establishment of new China, Wang Dexi moved to Tianjin University as director of its Chemistry Department. His endeavors of several years there turned it into one of the top chemistry departments in the country and more than 300 students graduate from the department every year.

In 1960, Wang Dexi transferred from Tianjin University to the Second Ministry of Machine Building—the Ministry of Nuclear Industry—and took part in the development of China's first atomic bomb. After that, together

with other people, he designed and built a factory for the after-treatment of military plutonium, using the extraction method instead of the settling method. The new method saved 360 million yuan in investment for the after-treatment factory and more than 1,000 tons of stainless steel as well. The extraction method and its successful application won him the Major Scientific Result Award at the 1978 National Science and Technology Conference.

Since the Third Plenary Session of the 11th CPC Central Committee, China's nuclear industry has diversified into the peaceful use of atomic energy, namely, the nuclear power industry. To meet the challenge of the new mission, the Ministry of Nuclear Industry, at Wang Dexi's suggestion, in 1985, set up a postgraduate division of nuclear industry, headed by him. At present, Wang Dexi, who has devoted his life to the country, is doing his utmost to train new blood for China's nuclear industry.

NORTH KOREA

Pyongyang Reportedly Smuggling Nuclear Know-How

SK0304122890 Seoul CHOSON ILBO in Korean
3 Apr 90 p 5

[Report by Kang Chon-sok from Tokyo]

[Text] The international community is suspicious of the fact that the nuclear facilities that North Korea is building in Yongbyon include a plant for reprocessing nuclear fuel, a process related to the manufacture of nuclear bombs. In addition to this, the question of the overseas source of North Korea's ultramodern technology has become a matter of public concern.

The May issue of SHOKUN, published by Japan's BUNGEI SHYUNSHYU, carried a special feature program on the current status of Japan as a base supplying sophisticated technology to North Korea.

North Korea's operations for obtaining technology from Japan have been carried out through the following two channels. One is the import of ultramodern instruments, which can be converted for military use, by circumventing the restrictions of Cocom (Coordinating Committee for Exports to Communist Areas) and the other is the channel of the General Association of Korean Residents in Japan [Chochongnyon]. North Korea had Chochongnyon organize a group of researchers in the field of ultramodern technology and obtained technological intelligence from them.

In particular, a good many Chochongnyon affiliated-scientists, who are members of the Association of Science and Technology of Korean Residents in Japan are known as top brains even in Japan, and some of these scientists and technicians extend assistance to North Korea for the development of its technology. Members of this association include an expert in elementary particle acceleration for nuclear fusion [haek yunhap solipcha kasok chonmun-ga], who is affiliated with Tokyo University and is chairman of a special committee of the association. They also include a technician who was awarded the prize of the president of the U.S. Society of Power-Driven Machines for developing a new type of engine based on the method of stratified air cleaning [chungsang sogi pangsik], as well as a scholar who is an expert in brake engineering and was awarded the prize of the Society of Automatic Brakes of Japan.

Of them, Mr. Yi Si-ku, chairman of the association, is one of the closest disciples of the most authoritative person in Japan's nuclear physics and is a core member in the nuclear science sector. Another member is engaged in the fluorine combination of weapons for the reprocessing of enriched uranium [mugi bulso hwahapmul hapsong]. In 1987, about 80 scientists and technicians in each ultra modern science sector visited North Korea.

In addition, a number of top-level Japanese scientists were invited to North Korea through the mediation of Chochongnyon-affiliated scientists and were requested to give technological advice.

North Korea requested materials and data for research and development from scientists in the field of semi-conductors and computers among the Chochongnyon-affiliated scholars, as well as from businessmen in the most advanced sectors of science. Thus, in 1987, 21,000 scientific documents were sent to North Korea through the initiative of this association. Another way that North Korea gains access to the most advanced sectors of science is by taking ultramodern instruments and equipment to North Korea through a route not detected by Cocom's surveillance network.

In September 1988, North Korea attempted to take about 1,300 pieces of equipment, including semiconductors and computers, by disguising them as garments, on a ship called "Samjiyon-ho," which called at Nihigata. However, North Korea's attempt was exposed to the public with the incident of Kim Pyong-to, vice chairman of the Chochongnyon-affiliated Chamber of Commerce.

Also, the incidents the Japanese police did not make public even after they detected them are: The incident of smuggling radars, sonars, and integrated circuits by Taesong Trade Company, a Japanese-North Korean trade firm, from 1984 to 1987; the incident of the request for import of transistors and audioscopes with amplification devices that can be converted for military use from 1975 to 1987; the incident of the attempt of Chochongnyon-affiliated persons to import in June 1988 the fluorine rubber and ultra-low temperature lubricant (for tanks in the polar regions), which can be used as a soundproof device in submarines and military ships.

It was learned that in addition to these incidents, North Korea is striving to seek vacuum pumps from Japan to use for nuclear reactors. North Korea is also seeking a Japanese trade partner in order to import anti-submarine sonars by disguising them as fish detectors and tank-manufacturing grinders by disguising them as simple machine tools.

SOUTH KOREA

Steps Urged To Counter North's Nuclear Threat

SK0804123090 Seoul CHOSON ILBO in Korean
3 Apr 90 p 2

[Article by O Tae-chin, reporter on North Korea desk, from the "Reporter's Memobook" column: "The Goal North Korea Seeks To Achieve Behind Its Nuclear Development"]

[Text] Based on a review of the accumulated technological studies made by North Korea over the past nearly 40 years, North Korea completed the building of a 30,000 kw research nuclear reactor in Yongbyon toward the end of

1987. A series of nuclear facilities under construction in Yongbyon, including this research nuclear reactor, will enable North Korea to produce plutonium in three to five years, and this in turn will enable it to produce nuclear bombs, according to some observers. Still others believe that North Korea may be able to do that well ahead of that schedule.

Since nuclear weapons are believed to be playing an extremely significant role in today's balance of military power in the international theater, any country's development and possession of nuclear weapons is under strict control and surveillance by international institutions. Major powers possessing nuclear weapons, therefore, keep a tight lid on the movement of nuclear technology and nuclear-related materials in close mutual cooperation. The major powers even have instituted the International Atomic Energy Agency to monitor whether any nations that do not possess nuclear weapons are attempting to use their nuclear facilities for military purposes.

In spite of this, North Korea has come close to developing its own nuclear weapons, thanks to the uranium—suitable for the production of nuclear weapons—that it is capable of producing on its own, and also thanks to North Korea's persistent pursuit of nuclear weapons, coupled with a stubborn political devotion—something that is possible only in such a tightly closed society as North Korea. So, even after signing the Nuclear Non-Proliferation Treaty, North Korea has adamantly refused to allow entrance to the international institution for nuclear inspections without bothering to take ensuing binding measures stated in the treaty, including signing an agreement on nuclear safeguards.

Now, however, North Korea is reported to be making a major change in its attitude, hinting that it is studying the possibility of allowing the international institution in to inspect the nuclear facilities in Yongbyon. According to NIKKEI SHIMBUN in its 1 April issue, North Korea will allow in the international inspection team to conduct necessary inspections before the end of this year and then become a member of an international system of mutual surveillance.

Possession of nuclear weapons is of great value, not only militarily, but also politically, to North Korea which stands alone in the middle of the hot wind of reforms sweeping through the communist world and is expected to have power transferred soon.

Now, what made North Korea to change its attitude and voluntarily call for an international inspection of its nuclear facilities, breaking away from its clandestine activity concerning nuclear development? Specialists tell of two possible reasons that made North Korea change its attitude. First, they believe that North Korea might have come closer to developing the so-called detonating device, the final stage of nuclear development capable of producing nuclear weapons. Second, they believe that North Korea intends to use nuclear development as an instrumental part of its policy toward the South.

For example, North Korea has recently hinted at its intention to apply its nuclear potential to its reunification strategy by calling for the withdrawal of U.S. troops from South Korea and nuclear weapons from South Korea in return for its allowing an international inspection of nuclear facilities. In fact, North Korea made the conversion of the Korean peninsula into a nuclear-free, peace zone last October a condition for its signing the agreement on a nuclear safeguard system.

Compared with South Korea's frustrated nuclear development project, North Korea's attitude as such is interesting. According to news reports, in preparation for the moves to reduce U.S. troops stationed in Korea in early 1970, former President Pak Chong-hui pushed ahead with nuclear development project, but later he had to give up the idea due to "pressure" from the United States.

At any rate, North Korea seems to make a long-term political issue out of its decision whether to allow the international nuclear inspections team in. North Korea seems to be hoping that it can use its nuclear weapons to shield itself from pressure for reform pouring in from all directions in the first place, and as a major winning card in relations with South Korea, the Soviet Union, and the United States.

Apart from North Korea's attitude as such, the fact that it possesses nuclear weapons in itself constitutes a serious problem concerning our survival. This being the case, it is high time for us to investigate for various ways to counter it.

KEPCO May Contract With USSR for Uranium

SK1104092190 Seoul YONHAP in English 0910 GMT 11 Apr 90

[Text] Seoul, April 11 (YONHAP)—Korea Electric Power Corp. (KEPCO) has been negotiating a 10-year contract to purchase enriched Uranium with the Soviet atomic power export corp., it was learned Wednesday.

A KEPCO official said that although a final agreement has yet to be reached, the Soviet firm has broadly agreed to sell KEPCO 3.9 million tons of enriched uranium over the next 10 years. The official, who refused to be identified, said a contract could be concluded by the end of the month. The price will be between \$560 per kilogram, as suggested by KEPCO, and \$580, the figure proposed by the Soviet exporter. Korea has never purchased nuclear fuel from a communist country.

Importing Soviet uranium concentrate is designed to diversify import sources of the nuclear fuel and to secure a stable supply at better prices. KEPCO buys refined uranium from Australia, Canada and France, ships it to the United States and France for reconversion and enrichment processing and imports the semi-processed product for final fabrication here before fueling its nine atomic power stations. Import prices average \$1,060 per kilogram.

Korea is locked into a 30-year contract for uranium enrichment with the United States until the year 2014, and a similar contract with France is good until 1996.

Annual consumption of enriched uranium for atomic power plants is about 200 tons: of which 70 percent is from the United States and 30 percent from France.

GERMAN DEMOCRATIC REPUBLIC

Reduced Uranium Production, Health Threat Detailed

90W/P0058A Bonn DIE WELT in German 23 Feb 90
p 23

[Article by Richard Schwalbe: "Sagging Demand Threatens Mine's Continued Existence"]

[Text] The passage through long tunnels, across mine railroad tracks, past drafty openings and red crates of explosives seems almost endless. It is lonely and quiet here, about 350 meters below the surface of the earth; occasionally ore dump trucks make a rumbling or jolting sound way off in the distance. Dimly lit by fluorescent lamps or miner's lamps, to the left and the right, on the ceiling and under foot there is dark gray rock which gives off a dull shine.

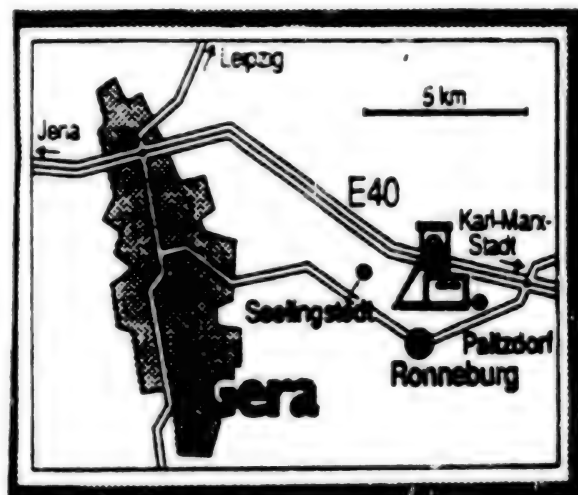
This is an underground walking tour: the Paitzdorf mine near Gera, one of six uranium mines in the GDR. For the first time visitors from the West have been granted access in the past few days to this facility which used to be kept completely secret. It is part of the Wismut Soviet-German Stock Co. (SDAG) which delivers the ore which is mined and dressed to the Soviet Union where it is further processed into nuclear fuel and raw material for building bombs.

Recently, there has been active citizen protest here, too, in the vicinity of the mine which with a total mining surface of about 20 square kilometers is located in the middle of the uranium deposits in the Thuringian basin. There is fear that mining radioactive material and further processing it will result in indefensible pollution of the environment and the underground work sites.

While the visitor stumbles along under ground, he is, to be sure, very conscious of an enterprise which clearly contrasts with the standard which is otherwise the norm in many GDR industrial plants: The strategic importance of uranium has obviously favored investment. There is no evidence of worn-out, dilapidated or neglected parts and fresh air flows everywhere through the tunnels.

According to Manfred Hoffmann, enterprise manager of the Paitzdorf mine, this stream of fresh air is the primary instrument for avoiding environmental pollution in the mine. The primary danger to the more than 3,000 miners comes from the dust which is stirred up by drilling, blasting and transporting. The radioactive radium present in it and the gas radon, which is its daughter product, can get into the body via the respiratory tracts and cause long-term damage there.

At the face, that is, where groups of two to three miners are breaking the rock loose and transporting it off, the visitor likewise encounters a curtain of water spray which is supposed to prevent dust from developing. The openings for the fresh air supply, as the miners say, are



right over the work sites. Here the air, which is forced via special shafts into the mine, which is up to 50 meters deep, flows out of the ends of large pipes and on its way through the tunnels carries the developing radon gas back to the surface.

According to Hoffmann, at their work site the miners are exposed to a maximum of about 1,100 Becquerels of radioactive pollution per cubic meter of air. Six so-called dosimetrists. Miners equipped with radiation measuring devices regularly monitor the amount of pollution. Records of these measurements are compiled for every worker; these show the total pollution for the totality of his work in the mine.

In the surrounding area there are, to be sure, concerns about the waste from the mine which are greater than those about work site pollution. About 65 percent of the 700,000 tons of ore per year are the so-called useful material which contains a concentration of uranium which makes further processing worth while. In Paitzdorf about 1.37 kg of uranium can be extracted from each cubic meter of ore mined.

According to Hoffmann, in connection with the waste, the problem is the older deposits which can contain even higher concentrations of uranium because of poorer grading methods. Today the effort is being made in Paitzdorf to keep the activity in the waste materials below the permissible limit of 0.7 Becquerels per gram. About 5 million cubic meters of waste have since been stored in the area around the mine.

Once again today a large amount of the waste is being back-filled underground into sections which have been mined out. Annually about 100,000 tons of cement are needed to set this. The building material which otherwise is in short supply in the GDR is produced expressly for the mine from the ash of brown coal power plants. After coming back up out of the mine it is obvious that the exhaust air is released into the surrounding area via three blower buildings. It is claimed that the natural pollution of the surrounding air, which is relatively strong anyway, is thus increased from about 100 Becquerels per cubic

meter by at most 20 Becquerels. The measured values of dust pollution in the surrounding air reveal up to 177 milli-Becquerels per gram.

Hoffmann emphasizes that overall people in Paitzdorf are proud of the high degree of pollution control. After the particles, which can also be utilized, have been separated all the waste water is again returned as water spray to the mine which, moreover, is not located in strata with ground water.

Nevertheless, in the next 10 years gradual shutting down of all uranium mining is expected. Of course not for environmental reasons, but rather because the operation is barely economically justified. In the meantime the Soviet Union, the sole customer, has long since ceased to be dependent on mining in the GDR.

Thus, even in Seelingstedt consideration is being given to a possible shut down. The Wismut SDAG preparation enterprise is in operation just a few minutes away by car from Paitzdorf. Here the share of uranium in the ore is increased as high as 60 percent by pulverizing, leaching, and precipitating in ion exchangers. Clearly less than 10 percent of the yellowish-brown raw product which is produced in the process consists of the really desirable radioactive isotopes of uranium.

According to enterprise manager Horst Jobs, in Seelingstedt there are really hardly any environmental problems because of the totally enclosed mills, extensive circulation of the auxiliary agents and steady ventilation of the factories. Nevertheless, the situation in the so-called sedimentation basins is complicated.

These are large open-air ponds into which the so-called leached product is fed. That is the liquid which is left after uranium separation in the ion exchangers. It still contains a large share of solids which gradually form a deposit in the ponds.

These ponds, which in all are about 50 hectares in size, produce rather large amounts of dust pollution whenever the deposited substances dry and are blown by the wind into the surrounding area. This dust has radioactive levels of up to 100 milli-Becquerels per gram. According to Jobs, covering will not always help since the ponds will be filled again after drying.

Nuclear Safety Program Rife With Shortcomings

90WP0047A Dusseldorf VDI NACHRICHTEN
in German No 7, 16 Feb 90 p 8

[Article by Michael Peter: "Nuclear Energy Hanging by a Thread"—first two paragraphs are VDI NACHRICHTEN introduction]

[Text] The future of Greifswald depends on materials and financing issues. The GDR is now seeking cooperation with the West in safety technology.

Not voluntarily, but only after the press had reported about conditions, some of them frightening, in the

Lubmin nuclear power plant, did the combine in charge Bruno Leuschner put its cards on the table. That is hardly surprising: The list of incidents is longer than anticipated. Included are damage to fuel elements, control malfunctions, runaway reactor operation, and fires. A commission from the West is currently working as fast as possible on a safety analysis.

Bonn's Ministry for the Environment (BMU) is reserved but decisive. Walter Hohlefeld, Director of the Department of Reactor Safety and Protection Against Radiation, said at the winter meeting of the Atomic Forum at the end of January in Bonn: "We are not the reactor safety ministry of the GDR, nor do we wish to become such." However, he continued: "It is still completely possible that before the end of the safety tests, the Greifswald nuclear power plant will have to be taken out of the service grid."

If in fact, intermediate data from the tests currently being conducted by the Society for Reactor Safety (GRS) and TUV [Technical Control Board] experts indicate that a safety risk exists, there will be a provisional shutdown at Greifswald Bay. The GDR Office of Atomic Safety and Radiation Protection (SAAS) which is responsible has, in fact, agreed not only to make the results public but also to accept them.

To be able to get the work done "as quickly as possible, but without time pressures" (according to Hohlefeld), the GRS and TUV committee formed four working groups. Respectively, they are responsible for materials issues, including nuclear materials, for system and control technology, for containment, and for analysis of previous incidents.

This introduces a new style into German-German cooperation because, just days before a few incidents were made public in the press, Lubmin combine director Lehmann and SAAS-State Secretary Georg Sitzlack were still silent about it with their guest, the Minister for the Environment from Bonn. Klaus Toepfer had spent three days visiting the Lubmin and Rheinsberg nuclear power plants, the Stendal construction site, and the Morsleben nuclear waste storage site.

Shortly thereafter, there was another visit from the West. And this time it got to the bottom of things. The Eastern colleagues talked more frankly this time; the Western experts inspected the nuclear power plant more carefully than the minister from Bonn. "We were in places where Toepfer did not go," explained BMU project director Michael Hertrich, who is coordinating the Western working groups.

The Western experts are being supported by their Eastern colleagues. After only about a week, a moving van half full of documents from Greifswald unloaded its freight in the West. Toepfer has been praising the "very motivated and qualified operations personnel" of the Bruno Leuschner Combine, 160 of whom work exclusively with nuclear materials issues.

Hertrich's first impression following a tour of the Greifswald nuclear power plant: "The installation appears to be rather well maintained." However, he also qualified that: "Such a thing could never have been built here in the West, neither now nor in the past."

The "Thing" in Lubmin is designed in eight blocks. Four 440-megawatt blocks are in operation; the first block was connected to the power grid in 1973. At Greifswald Bay (on the Baltic Sea), the site selected in the mid-1960's because of the cooling water reservoir and because of the shortage of coal, there are Soviet pressurized water reactors (water-water energy reactors WWER 440) of the Nowo-Woronesh type. Their major deficiency: They are not earthquakeproof, and they also have no protective shell (containment) to protect them against aircraft impact. A fifth block of a new design (WWER 440 MW 123) has been silent following short test operation in November of last year. When the automatic emergency shutdown was being tested, nothing at all happened at first. After 40 to 50 seconds, it was necessary to shut the reactor down manually. Presumably, there was fuel element damage during this unsuccessful test. In any event, the "entire electrical system has to be checked from one end to the other," (according to Hertrich).

Undeniably, the most dangerous incident at the Greifswald facility occurred in 1975. During a fire in the engine room, the entire cooling system for block 1 failed. One of six emergency cooling pumps was successfully connected to the circuitry of the adjacent reactor. The inertia of the reactor, one of its trademarks, prevented more serious consequences: The water volume in the steam generators is, in fact, so great that it can dissipate residual reactor heat for five to seven hours.

Even the manager of Greifswald, combine director Reiner Lehmann acknowledges that not everything is as it should be. Lehmann sees the need for retrofitting. The most significant items on his list: Incident management, better training of the personnel for crises and equipping the blocks with electronic error diagnostics.

Retrofitting costs for the Greifswald nuclear power plant have not yet been determined. Toepfer mentioned after his visit that he was now partially responsible for the safety of the reactors. However, he left open the question of whether he also bears any financial responsibility. The GDR certainly cannot finance the improvement of safety alone. The FRG government is itself now under pressure as an "accessory."

The GDR is looking for cooperation with the West in matters of safety. But without the Soviets, nothing can be done. As builders of the reactors, they are the most familiar with the materials problems. If they will pass on their knowledge, the GRS and TUV experts can save a great deal of time. Bonn wants to avoid time delays in light of the unsafe conditions. Minister Toepfer therefore had no choice: He had to go to Moscow and "invite" the USSR into the cooperation. This is significant not only in terms of Greifswald. There are, of course, Soviet nuclear power plants in other CEMA countries.

The GDR is no giant in nuclear energy. The two nuclear power plants in Lubmin and in Rheinsberg deliver just 10 percent of the electric power consumed. The oldest GDR nuclear power plant, in Rheinsberg 80 km north of Berlin, today serves primarily for training and research. The Soviet-designed pressurized water reactor went on line in 1966 at 70 Mw and was at the time the first nuclear power plant in the East bloc outside the USSR.

The plans which the GDR is furthering with the nuclear power plant in Stendal (between Wolfsburg and Berlin) were and continue to be ambitious. In fact, electricity and remote heat were supposed to have been delivered from there beginning in 1985 according to the 1974 construction agreement between the GDR and the USSR. But then priorities were again shifted to brown coal power plants.

The new plans provide for the first reactor, a 1,000-Mw WWER, to go on line in 1994; i.e., with approximately the same output as the blocks in Biblis in Hesse. According to recent calculations, the first two reactors should cost 17.4 billion GDR-marks. Two more are planned.

ARGENTINA

Official Denies Rumors of Nuclear Waste at Port

PY1304010890 Buenos Aires Domestic Service
in Spanish 1600 GMT 12 Apr 90

[Text] The General Port Administration this morning denied the alleged presence of nuclear waste containers at the Buenos Aires Port.

The report of nuclear waste, made by LA RAZON, caused residents of the capital to become concerned about the alleged presence of dangerous chemical products from abroad. (Ruben Citara), deputy trustee of the General Port Administration, said that the area where the containers are located is not a depot for explosives or inflammable chemical products as reported. So far nothing has been said about what is inside the containers.

Manuel Mondino, chairman of the National Commission for Atomic Energy, also denied the presence of a nuclear waste in the Buenos Aires port. He also reported that the Atucha nuclear plant will operate with 75 percent of its capacity on 14 April. The plant is currently operating only at 50 percent capacity.

Cavallo Proposes Nuclear Cooperation With EC

PY1104203390 Madrid EFE in Spanish 2041 GMT
10 Apr 90

[Excerpt] Dublin, 10 Apr (EFE)—Argentine Foreign Minister Domingo Felipe Cavallo is in Dublin to attend the meeting of EEC and Group of Rio foreign ministers. He expressed the Argentine Government's desire to analyze future nuclear cooperation with EEC nations.

The meeting will be held at Dublin Castle this afternoon. Cavallo will brief the EEC countries on the Argentine Government's interest in increasing their supply of agricultural products to the European market. This is Cavallo's first visit to Ireland.

Cavallo said that Argentina wants to initiate a process of cooperation with high-level technology groups. He expressed special interest in the Euratom program.

Cavallo said that European cooperation is necessary for the organization that is being created in Latin America to investigate and to control nuclear technology for peaceful use. He added that this organization is based on a Brazilian-Argentine nuclear cooperation agreement.

Cavallo said that the drive to develop the cooperation agreement between Brazil and Argentina on nuclear matters will help to create a leading Latin American system similar to the one that is being implemented through the Euratom program and related to the TNP (Non-Proliferation Treaty).

Cavallo said that European cooperation would help to create mechanisms to continue the program for peaceful purposes. He added that the possibility of distrust would

also be avoided because joint action will be taken to implement this project. [passage omitted]

BRAZIL

Aramar To Receive \$40 Million in 1990

90WP0059D Sao Paulo O ESTADO DE SAO PAULO
in Portuguese 9 Mar 90 p 11

[Article by Rubens Santos]

[Text] Brasilia—The Brazilian Autonomous Nuclear Program, or so-called parallel program, which achieved complete mastery of the nuclear fuel cycle in 1987, will not be abolished, contrary to speculations in recent days. Quite the opposite. The program, which is backed by the Navy, is to receive an injection of \$40 million this year. That money will be used solely at the Aramar Experimental Center, which is located in Ipero in Sao Paulo's interior and is responsible for the isotopic enrichment of uranium and the building of a nuclear reactor for submarine propulsion.

"We need and are going to regenerate the autonomous program—not order its elimination," said Admiral Othon Luiz Pinheiro in Brasilia yesterday. Othon is head of the Navy's Coordinating Office for Special Projects (Copesp), which is in charge of the Aramar Experimental Center. Yesterday in Brasilia, Minister of Navy Admiral Henrique Saboya and Adm Othon signed an agreement establishing the Ipero High Technology Park, whose basic raw material will be nuclear energy. When questioned about the probable elimination of the parallel program, Adm Saboya declined to comment.

According to the agreement signed in Brasilia yesterday by the minister of Navy, the minister of science and technology, and the mayor of Ipero, about 420 firms are to be selected over the next 90 days to occupy space in the Ipero High Technology Park. Those firms will be the recipients of technologies developed by the Aramar Experimental Center as by-products of nuclear technology. The technologies involved have applications in the fields of fine chemicals, biotechnology, new materials, precision engineering, and computer science.

Research Center Opens in Montes Claros

90WP0059C Sao Paulo O ESTADO DE SAO PAULO
in Portuguese 8 Mar 90 p 15

[Article by Ricardo Campos]

[Text] Belo Horizonte—The Center for Applied Nuclear Technology, located in the municipality of Montes Claros 497 km from Belo Horizonte, today begins its activities aimed at contributing to agriculture in Brazil's Northeast. Using radioactive isotopes and electronic sensors, the center will measure the exact quantity of water needed to grow the region's typical crops. The result will be an increase in productivity. Also to be carried out at the site is research in the field of health, an

example being the control of endemic rural diseases, chiefly schistosomiasis and Chagas' disease.

Rex Nazareth, chairman of the National Nuclear Energy Commission (CNEN), explained yesterday in Montes Claros that the new center intends to transfer technology to sectors of private enterprise, research organizations in the Northeast, and other segments of society involved in using more modern agricultural methods. Nazareth said that as a result, the center would not remain permanently in Montes Claros; instead, it will move to other regions once the methods of agricultural recovery have been assimilated in Montes Claros. The CNEN chairman took advantage of his visit to Montes Claros to allay the fears of the inhabitants by assuring them that the center does not present a danger of radiation. According to him, the municipality was chosen as the home of the center because it is part of the Drought Polygon and is close to the country's largest cities: Sao Paulo, Rio de Janeiro, and Belo Horizonte.

The researchers at the Center for Applied Nuclear Technology in Montes Claros will begin the project by making a detailed study of the region's hydrographic basin in an attempt to detect and correct the main causes of drought in the Northeast.

Activities of Ipero High Tech Park Described

90WP0059B Sao Paulo O ESTADO DE SAO PAULO
in Portuguese 8 Mar 90 p 15

[Article by Rubens Santos]

[Text] Brasilia—The city of Ipero in Sao Paulo's interior is going to have a high technology park where the predominant investments will be in the sectors of nuclear energy, new materials, precision engineering, biotechnology, computer science, and fine chemicals. Those sectors, which will be set up by private enterprise, will receive technology developed at the Aramar Experimental Center, which is one of the centers established by Brazil's Navy-controlled parallel nuclear program.

To make the establishment of the high technology park official, an agreement will be signed in Brasilia today by the Municipality of Ipero and the Ministries of Navy and of Science and Technology. The list of programs to be developed in the park covers fields ranging from the manufacture of carbon fiber and the separation of rare earths (a strategic material) to the isotopic enrichment of materials for medicinal and industrial use. The project will be administered by a foundation to be established by the Municipality of Ipero, which will also assume responsibility for some of the investments (schools, roads, and electricity) needed to set up the technology park.

The coordinators of the project believe it will be possible to develop inertial guidance systems and steam turbine components in Ipero. Also called for in the agreement is

the development of a nuclear minireactor for the generation of electricity and of a reactor for the production of isotopes used in treating cancer.

To achieve the program's objectives, the three main partners in the high technology park—the municipality, the Navy, and the Ministry of Science and Technology—have divided up a number of tasks. Ipero's mayor, Benedito Valario, will be in charge of installing the infrastructure. The Navy will guarantee access to the laboratories at the Aramar Experimental Center and also allow the transfer of technologies which have already been developed and can be marketed. The Ministry of Science and Technology is to monitor and evaluate the results of the agreement, contribute available information in strategic areas, and support the training of human resources.

The agreement that will be signed today by Benedito Valario and Ministers Decio Leal de Zagottis and Henrique Saboia is coming into being at a time when the team working for the president-elect of the Republic, Fernando Collor, has not yet decided what will happen to the Brazilian nuclear industry and its two development programs: the parallel program and the one covered by the Brazil-FRG agreement. That uncertainty is due to a quarrel among the military ministries over what will happen to the National Nuclear Energy Commission (CNEN), headed by physicist Rex Nazareth Alves, since that commission is linked directly to the National Defense Advisory Secretariat (Saden). Collor's advisers say that Saden and the current CNEN will go out of existence.

Othon Reviews Successes of Naval Program

90WP0059A Sao Paulo O ESTADO DE SAO PAULO
(Special Supplement) in Portuguese 13 Mar 90 p 6

[Address by Rear Admiral Othon Luiz Pinheiro da Silva to the Sao Paulo Regional Branch of the Brazilian Naval Engineering Association; date not given—first paragraph is O ESTADO DE SAO PAULO introduction]

[Text] Rear Admiral Othon Luiz Pinheiro da Silva (naval engineering) has been chairman of Copesp [Coordinating Office for Special Projects] since 1985 and director of reactor research at the IPEN [Institute for Nuclear and Energy Research] since 1982. He received his academic training at MIT, the EPUSP [Sao Paulo University Polytechnic School], and the Naval School. These remarks are from an address delivered to the Sao Paulo Regional Branch of the Brazilian Naval Engineering Association (Sobena).

In 1978, the idea developed within the Navy that it would be desirable for Brazil to have a nuclear-powered submarine so that by the start of the 21st century, our naval power would be commensurate with the dimensions of Brazilian maritime interests and our maritime vulnerability.

And why, specifically, is it important to have nuclear propulsion?

- Whether we like it or not, we are a country looking out over the Atlantic Ocean and have a coastline totaling 7,408 km.
- Of our total population of approximately 145 million, about 105 million, or 72.4 percent, live in a coastal strip extending up to 100 km from the ocean.
- Over 90 percent of our foreign trade is carried by sea.
- Considering only the 200-mile-wide zone of economic influence along our coast, we have an area of 2,750,000 square km—the equivalent of 32.3 percent of our continental area. In reality, according to international consensus, that zone of economic influence comprises the entire continental shelf, which in our case extends beyond 200 miles in some places. We extract two-thirds of our petroleum production from that continental shelf, and it is known to have an abundance of other minerals.

To protect all those maritime interests, it is essential that we be prepared so that if necessary, we can keep other countries from taking control of the sea in that zone of economic influence and prevent them from exploiting it economically without our consent.

The nuclear-powered submarine constitutes the most effective choice for denial of maritime control, since it cannot be located by satellites and is difficult to detect if it is of a modern design enabling it to travel silently. Its price is equivalent to that of a surface vessel the size of a frigate.

It is therefore essential that our Navy have nuclear propulsion so it can carry out its mission at the lowest cost to society.

Moreover, we are sure that nuclear energy is a strong candidate for meeting the additional demand that will arise from our pattern of electricity consumption in the not very distant future, considering the exhaustion of our hydroelectric potential and the cost and problems associated with other alternatives. That being the case, it is essential for us to learn now so that we will be able to exercise the nuclear option when that becomes necessary without external dependence and supervision as regards technology and supplies.

Scope of Program

It became clear as early as 1978 that expertise in nuclear propulsion would have to be developed autonomously and that it would have to include mastery of the nuclear fuel cycle using domestic technology—separate from the Brazil-FRG agreement—as well as the development of a small power reactor that could be used for propulsion, depending on a national decision by the appropriate authority.

The importance of mastering the nuclear fuel cycle arises from the fact that international restrictions and the international embargo focus on the relevant technology.

Incidentally, Brazil's chief motivation in signing the Brazil-FRG agreement was its need to master that technology, since the importation of nuclear power plants—the main commercial purpose of the agreement—was not embargoed at the time and still isn't.

The stage of the fuel cycle presenting the biggest technological challenge is the isotopic enrichment of uranium, which for that reason has always been the major focus of effort in that portion of the program concerned with the fuel cycle. The technology selected was the ultracentrifuge enrichment process, that being regarded as the most promising technology from the standpoint of independent development.

In 1981—1 year after the design work was finished—manufacture of the first prototype ultracentrifuge was completed, and September 1982 marked the successful conclusion of the first operation for isotopic enrichment of uranium using equipment designed and built entirely in Brazil.

In 1983, the program was revised and expanded, passing from the development of ultracentrifuges to the development of isotopic enrichment plants. In other words, the effort began to Brazilianize and industrialize all the peripheral equipment needed by enrichment plants.

In April 1988, the Alvaro Alberto Unit, which constitutes the first stage of the Demonstration Plant for the Isotopic Enrichment of Uranium, was inaugurated. Completion of that plant constitutes the main goal of the program as far as the nuclear fuel cycle is concerned. In addition, the other demonstration plants in connection with the cycle have already been designed, and the start of construction is being held up solely by the lack of funds.

Also in its final phase of construction, with completion scheduled for this year, is a testing station for the development of steam equipment.

A significant number of the components for the first domestic pressurized water reactor are being manufactured by our own industry, and preparation of the site on which that reactor will be built is also under way.

In other words, the first genuinely domestic power reactor is in gestation, and it will certainly enter service in the first half of this decade.

We are now in a position to take the next step toward a second domestic pressurized water prototype. And we have been authorized to design a small nuclear power plant with a capacity of from 60 to 100 MW. Its design will include the modern concepts and techniques that were used in designing the first prototype, making it an intrinsically safe reactor, as all power reactors of the new generation will be.

Management Approach

Isolated development of nuclear expertise by the Navy would have been impossible, and even if it had been

possible, it would have meant a highly inefficient duplication of resources. For that reason, it was decided to take a cooperative approach by enlisting the technical, scientific, and industrial capacity that already existed.

As regards development of the ability to design and build nuclear power plants, it was decided to establish intermediate goals—to achieve expertise in the fields of nuclear core design, high-pressure thermohydraulics, and steam equipment—and then to have everything converge on the design and construction of a small-scale power reactor.

The intermediate goals are taking shape in the form of major experiments aimed at validating theoretical calculations. In November 1988, for example, the IPEN/MB-01 zero power reactor went into operation. To make that possible, all the stages necessary for producing its fuel had been completed, all the necessary instrumentation had been developed, and all the related equipment and systems had been designed and built in our country.

The experimental 150-bar thermohydraulic circuit also went into operation in November 1988. It, too, had been designed and built entirely in Brazil, and it has the same capabilities as the circuits used at centers in the developed countries where pressurized water reactors were developed.

In 1978, the research institutes belonging to the National Nuclear Energy Commission (CNEN) were transferred to Nuclebras [Brazilian Nuclear Corporations, Inc.]. By contract, all the technical managers in the latter's subsidiaries were necessarily West German. The natural result was a decline in the importance of research at the national institutes, if not for commercial reasons, then because of their natural identification with the research centers for which those managers had formerly worked.

The only institute not taken over by Nuclebras was the current Institute for Nuclear and Energy Research (IPEN) in Sao Paulo. But since the IPEN had been transferred from the Federal Government to the state government at the start of that decade, it received no support from either Nuclebras or the CNEN. Although its cost was borne by the State of Sao Paulo, it lacked a major program for catalyzing its efforts and capabilities.

On the other hand, the Navy had had very close ties with the Sao Paulo scientific community since World War II. That relationship had begun with work at the USP [Sao Paulo University] Physics Institute, but it expanded as a result of the agreement with the IPT [Institute of Technological Research] and the Navy's decision to train most of its engineering officers at the USP. The natural result was that the Navy and the IPEN drew closer to each other and became partners in this undertaking.

Their relative shares in the undertaking take into account the respective capabilities and characteristics of the two institutions. In general terms, the Navy provides most of the funds, manages the work involved in designing, building, and operating facilities, and handles

the engineering tasks. The IPEN's technical personnel play an active part in the activities typical of a research institute: scientific activities, systems design, and operations at the laboratory level.

The IPEN is now back in the federal sphere and is currently subordinate to the CNEN. For its part, the Navy has established the Coordinating Office for Special Projects (Copesp), with offices near the IPEN in Sao Paulo, to manage the program. That pattern of close cooperation between the Navy and the national nuclear energy agency in developing nuclear propulsion and nuclear power plant technology has been followed successfully by the United States and France.

The overall approach to the various components of the program comprises the phases of design, laboratory testing, and construction of prototypes or pilot industrial demonstration plants for evaluation and possible adjustments to the program, as well as surveys of economic parameters. The program does not include the construction of industrial units for commercial purposes, since that is to be handled by other organizations, either public or private.

Good engineering practice, integrity, and prudence make it desirable that the pattern outlined above be followed in the case of new development projects. Hastiness or amateurism often leads to an attempt to shorten or eliminate the intermediate phases of conducting experimental tests and building pilot units despite the low cost and ease of making corrections as the work progresses. In most cases, the result of that omission is an industrial facility with birth defects which compromise its commercial operation.

As regards design activities, we have adopted the general rule that planning of the various systems should be done internally, using the services of technicians and scientists from Copesp, the IPEN, and various other domestic research institutes and universities. After that, the major genuinely domestic design firms are awarded contracts for the basic and final designs, the development of which is overseen by personnel from the same team that planned the systems.

That approach has made it possible to involve Brazil's major design firms as well as many smaller, but highly qualified, firms. The diversification of contracts has led to healthy competition, with positive effects on the cost of the undertaking, and success can be measured by the fact that we have acquired the capability of designing complex steam, vacuum, and chemical process systems that previously did not exist in our country.

As regards the industrial plant involved in the manufacture of equipment, there now exists a system for Brazilianizing and industrializing equipment and components that involves the technical personnel at Copesp and a great many large domestic firms.

Activities at the laboratory level are carried out chiefly at the Copesp and IPEN facilities in Sao Paulo. In addition,

the Aramar Experimental Center is being set up in Ipero near Sorocaba. That is where the prototypes and demonstration plants are being or will be built.

Costs and Results

The total cost of the 10-year development program comes to the equivalent of \$292 million, an amount that was divided equally between activities related to the nuclear fuel cycle and those concerned with the development of reactors. Of the total cost, about 85 percent was accounted for by expenditures on personnel and materials in Brazil.

The results now achieved are manifested both in the mastery of various technologies as mentioned above and in the effective mobilization of national technological capability. Deserving of special notice is the strong presence on Copesp's staff of naval, mechanical, and nuclear engineers who are engaged chiefly in creative activities.

Moreover, we see that the equipment that has been developed is actually being put to use in the electro-electronic, pharmaceutical, fine chemical, petrochemical, food, and packaging industries.

In that connection, it is worth pointing out that as a result of this program, Brazil is now capable of manufacturing the higher-strength commercial steel alloys known as maraging steel, which has wide applications in the field of aeronautical components.

Of the equipment that has been developed, pumps, valves, and measuring devices are the items that have had the widest dissemination. A typical example is the mechanical blade pump, which has widespread applications. Its users already include such firms as Telebras [Brazilian Telecommunications, Inc.], Petrobras [Brazilian Petroleum Corporation], Autolatina, Light Metal, Matarazzo, Sadia, Siemens, and Elebra [expansion unknown], among others.

Conclusion

The Navy's program for acquiring expertise in nuclear propulsion constitutes a very serious engineering effort which we are certain will make a real contribution to the improvement of domestic engineering technology.

Political and economic constraints mean that we engineers often find ourselves struggling with the transfer of already developed foreign technologies. The result is that we do not often have the opportunity to engage in one of the noblest tasks of engineering: that of designing systems. The more than 60 naval engineers involved in this program have the professional good fortune to be working alongside technicians from other fields in the planning, design, testing, and construction of the prototype of an advanced ship propulsion system. This is certainly an unequaled opportunity for the Brazilian engineer.

Similarly, the scarcity of funds imposes severe restrictions on our universities when it comes to experimental activities, which are usually carried out under precarious and inadequate conditions. The program's strong experimental content is certainly contributing to the development of an experimental mentality.

With courage, boldness, humility, and determination, Brazilian technicians are pursuing a technological objective that goes far beyond the interests linked exclusively to the constitutional mission of the Navy. We are certain that Brazil needs other similar programs in the various fields of high technology. As the Copesp slogan says: "Technology of one's own means independence."

PRC Envoy Discusses Satellite Project Delays

90WP0065C Rio de Janeiro O GLOBO in Portuguese
16 Mar 90 p 35

[Text] Sao Jose dos Campos—Lin Zongtang, China's minister of aerospace industry, in Brazil to represent his government at President-elect Fernando Collor's inauguration, will hold two meetings in Brasilia today to discuss the delays, schedule, and lack of payments for Brazil's portion of the principal Brazil/China cooperative program. The program involves the development of remote-sensory satellites of the natural resources type whose launching will have to be postponed from the end of 1993 to the middle of 1994.

The Chinese minister's first meeting will be at 1100 hours with General Jonas Moraes Correia Neto, head of the Armed Forces General Staff (EMFA), who chairs the Brazilian Commission for Space Activities (COBAE), the organization serving to coordinate the Brazil/China cooperative space program. In the afternoon the minister will meet with Jose Goldemberg, secretary of science and technology. On Monday he goes to Sao Jose dos Campos where he will visit Embraer [Brazilian Aeronautics Company] in the morning and the Institute for Space Research (INPE) in the afternoon.

According to INPE researcher Cesar Celeste Ghizoni, manager of the Brazilian part of the program, the schedule will be delayed 4 to 5 months, and there are not enough funds to continue the program. Last year INPE asked the administration for \$20 million; the request was not granted. This year INPE requested \$24 million, but the cuts made by Congress limited the allocation to \$6 million. Until now INPE has received less than \$1 million.

"As of last year," says Cesar Ghizoni, "it was still possible to finance trips and projects, but the program has now arrived at a phase where contracts by Brazilian and Chinese firms are necessary to produce satellite subsystems and components, and this is not possible without definite funds."

The projected satellites will be capable of photographing objects on land which are more than 20 meters in extent, a capability identical to that of the American Landsat

satellites. The development and launching of the satellites will cost \$150 million, which represents one-third of the cost of similar programs in more developed countries.

Brazil is responsible for one-third of the program and will invest \$45 million, according to an agreement signed in 1988 by former President Sarney. Brazilian and Chinese scientists have already exchanged technical visits in planning the satellite which will weigh 1,400 kg and will have an orbit 738 km in altitude.

Scientists Request Role in Policy Formation

90WP0065B Rio de Janeiro O GLOBO in Portuguese
15 Mar 90 p 38

[Text] Yesterday a group of scientists associated with the nuclear sector sent President Fernando Collor a message requesting that the formulation of the new Brazilian nuclear policy be made only after heeding the advice of outstanding individuals involved in that matter. The document, signed by Hildebrando Goes, president of the Rio de Janeiro Engineering Club, was further underwritten by the Brazilian Association of Nuclear Engineering, the Brazilian Physics Society, and the Brazilian Society for Scientific Progress.

The letter asserts that after 29 years of good citizenship it will once more be possible to make important decisions without amply consulting the group of scientists in question, repeating what occurred at the time of the signing of the nuclear accord with Germany and the reorganization of the sector involved.

LNLS To Acquire Permanent Site

90WP0065A Sao Paulo FOLHA DE SAO PAULO in Portuguese 16 Mar 90 p 6

[Article by Campinas correspondent Rosana de Vasconcelos]

[Text] Within two years the National Synchrotron Light Laboratory (LNLS) is to acquire its permanent site which will occupy 30,000 of the 380,000 square meters of land located between the Campinas State University (UNICAMP) and the Telebras [Brazilian Telecommunications, Inc.] research center in Campinas (100 km northwest of Sao Paulo). The land was being expropriated by the state government as of last week, and the court has determined the amount of the indemnity involved. The land will be allocated to the laboratory through a grant.

The LNLS was established at the initiative of the National Council for Scientific and Technological Development (CNPq) and will have the first circular electron accelerator in the Southern Hemisphere. The synchrotron light is emitted through high-frequency electrons when their movement is altered by a magnetic field. It is used to study materials in general and finds

particular application in medicine, physics, chemistry, biology, physical sciences, etc.

The first phase of the project was completed on 19 February with the inauguration of the linear electron accelerator. According to Cylon Goncalves da Silva, 43 years of age and director of the laboratory, there was a gain of six months in the schedule inasmuch as the linear accelerator is to be finished in July of this year. The next phase is expected to incur a delay of 18 months, according to the LNLS director.

On the day of the inauguration of the linear accelerator, CNPq signed an agreement with Cern (European Laboratory for Particle Physics) whose objective is to permit Brazilian scientists to develop research projects using Cern's facilities. Prior to the agreement, the possibility of doing this was restricted to researchers who had personal connections with scientists already working at Cern. Access is now available to anyone who is interested. The ceremony commemorating the signing of the agreement was honored with the presence of Carlo Rubbia, Cern's current director and recipient of the Nobel prize for physics in 1984.

The initial forecast stipulated that the circular accelerator would be completed by the middle of 1993, but the staff now expects the end of the construction phase to occur in 1994. That change in plans occurred through the lack of a definite site. The circular accelerator will be 20 meters in diameter and 70 meters in circumference and can only be built at the site in question, contrary to the linear accelerator which will be dismantled in keeping with the change.

According to the director, the synchrotron-light laboratory emerged with the objective of pursuing two arrangements: the concept of a national laboratory which would offer its services to anyone in need of those services, and government investment in research in conjunction with private initiative. All of the investment funds required (\$70 million, with \$13 million already allocated) will be set aside by the CNPq, but the private sector is represented in the laboratory's general management by businessmen Jose Diniz de Souza, of Eletrometal, Giordano Romi, of Romi Industries, and Peter Mangels, of Mangels. According to the director, that association's objective is to facilitate the application of the "know-how" created in the laboratory and also to develop suppliers subsequently trained in the technology of component manufacture.

In Europe and in the United States many industries benefit from projects which have undergone research, particularly in particle physics. In a number of centers of excellent scientific performance, we find industrial entities where state-of-the-art technology produces not only components for direct use in basic scientific experiments but also the so-called "spin-off" products, that is, equipment of a more immediate technical use. The production

of that type of equipment is the direct result of technology developed for the purpose of supplying components for the research centers.

Because of the lack of prior experience in Brazil with synchrotron light, the laboratory's board of directors decided to submit the project for evaluation by foreign specialists. Last year, a group of seven American and European research scientists spent a week evaluating the linear accelerator and the circular accelerator project. Both projects were approved. The group included representatives from Cern, Stanford University (United States), the University of Wisconsin (United States), Lund (Sweden), and Paris (France). When the prototypes of the circular accelerator have been completed, the LNLS director plans to hold a new workshop with foreign representatives.

CNEN Rejects 'Interference' in Nuclear Program

*PY1804032890 Brasilia Domestic Service
in Portuguese 2200 GMT 17 Apr 90*

[Text] Brazil wants to discuss the new Brazilian nuclear program, but will not allow foreign interference in its execution, according to the National Nuclear Energy Commission [CNEN] president.

Brazil will not allow international interference in its nuclear program, affirmed CNEN President Jose Luiz Santana, reacting to a report published today that the Central Intelligence Agency [CIA] of the United States might be concerned about nuclear production in the Third World and particularly in Brazil.

[Begin Santana recording] In case the CIA is concerned about some matters regarding our internal affairs, at the least I would say that it is interference. The Brazilian Government does not accept this type of interference. This will be the first time we discuss our nuclear program openly, even with scientific entities and organizations. Indeed, we want to discuss the new Brazilian nuclear program openly. [end recording]

The group [not further identified] that is discussing the Brazilian nuclear program has 60 days to submit its conclusions. For the first time entities that used to criticize the program and had not been consulted in the drafting of the program are participating in the discussions.

Navy To Develop Plant Project With IPEN

*90WP0063A Rio de Janeiro O GLOBO in Portuguese
11 Mar 90 p 19*

[Article by Fanny Zygband]

[Text] Sao Paulo—The first Brazilian nuclear plant, constructed solely with domestic technology, is being planned by the Navy and the Institute for Nuclear and Energy Research (IPEN), one of the principal research centers of the National Commission for Nuclear Energy (CNEN). The plant is expected to start up within 8 to 10

years and, according to scientists associated with the Brazilian Nuclear Program, its technology is at least 20 years ahead of Angra I, II, and III which are considered out-of-date.

According to Rear Admiral Othon Pinheiro da Silva, chairman of the Coordinating Committee of the Navy's Special Projects (COPESP)—the institution's right arm in the nuclear sector—the project of the Brazilian nuclear plant is based on a concept which is being simultaneously developed by a number of countries which control nuclear technology, such as the United States, Canada, England, France, and Japan and will assure Brazil access to the select club of manufacturers of atomic plants.

The concept of reactors and plants in the 1990's has greatly changed and seeks to satisfy three basic requirements: safety, economy, and facility of operation, which means using the least number of operators running the plant.

The rear admiral believes that the Navy's pursuance of the path of energy generation is a "natural development" of the competency acquired in developing the Renap 1, the prototype of the reactor used in the propulsion of submarines which is in an advanced stage of construction at the Aramar Experimental Center maintained by the Navy in Ipero, in the interior of Sao Paulo. In his opinion, the nuclear submarine is already a funded project and the Navy's role is now that of building reactors.

The principal innovation incorporated in the atomic plant project which the Navy is developing in conjunction with the IPEN is the cluster system—or group of plants—which foresees the construction of plants in modules, each one containing a reactor and a complete energy-generating system. The modules can be aligned in a parallel manner—for a total of at least five—commensurate with the energy demand of the area in which the plant is to be installed. According to Gilberto Gomes de Andrade, head of COPESP's Department of Nuclear Systems, practically speaking, the system makes it possible to build facilities smaller than those of Angra (the Angra II is said to have a capacity of 1,200 megawatts) and with a more rational and economical generation of energy.

"The cluster makes it possible to mount lines with variable power capacities, from 100 to 600 megawatts per module. That of 100 megawatts would be compatible with the electrical networks of the north and northeast while that of the southeast would require powerful reactors whose energy supply and demand would increase proportionately," he said.

Cluster System Permits Cheaper Operation

Although the Navy and IPEN have not yet estimated the cost of the plant, it is calculated that the cluster system will be at least 40 percent cheaper than the model adopted in Angra. Gilberto Gomes de Andrade, head of

COPESP's Department of Nuclear Systems, explained that this is due in part to the fact that some sectors of the plant's infrastructures can be used to control the various reactors. To get an idea, in Angra the plants were perfected to the point where they functioned as autonomous units and this, according to the technician, makes their operation much more expensive.

According to Rear Admiral Othon Pinheiro da Silva, the safety concept adopted as a necessary prerequisite of the Brazilian plant is on a par with that of advanced reactors. Renap 2, the prototype of a reactor for generating 100 megawatts of power, is now being developed by the COPESP and IPEN engineers. It will serve as a sort of guinea pig for tests and will further serve as a safety model—known as a passive safety system—which developed countries are inclined to consider a favorable adjunct for the 1990's. This type of reactor differs from that of Angra, especially in the treatment it gives to the energy which it releases from the reactor after the plant has been shut down. Instead of using pumps and piping to dissipate that energy, it employs the plant's own water-circulation system.

"Every atomic plant continues to generate energy, about 2 percent of its power, even after being shut down. That heat is dangerous, for it can accumulate, building up pressure and causing an accident. Using the natural circulation of water is safer because it precludes the use of equipment which, although tested, is subject to defects," he observed.

Andrade goes on to say that in striving to obtain greater safety in atomic plants, the world's most modern reactors—including the one now being designed—are attempting to reduce the number of maintenance and component systems to a minimum and change the plant's manual operation to one of automation. In addition to exposing less people to radiation, this would reduce the possibility of mishaps.

The rear admiral asserts that Brazilian industry is fully capable of producing reactors with the necessary specifications for the production of energy and still provide the plant itself with all necessary safety precautions. The plan being studied by the Navy and IPEN—one which should take precedence in the Brazilian system—is that of constructing prefabricated power plants. The concept is that each module of the cluster will have a solid concrete base, a kind of platform on which the principal components of the plant are to be mounted: the reactor, steam generator, pressurizer, and refrigeration equipment.

According to Rear Admiral Othon Pinheiro da Silva, the process in question has two advantages: being a single block, it avoids dangerous dislocations among the components in case of seismic tremors. And it also reduces the time spent in building the plant. Instead of taking 7 or 8 years to complete the installation—the world average in general—the plant can be under way in only four.

Technology for Fuel Production in One Year

The image of a Ferrari operating with a Volkswagen motor, used by scientists of the Brazilian Nuclear Program to indicate that the lack of funds has acted as a brake on the technological potential of the nuclear area, will aptly portray what the nuclear sector will be facing during the first year of the Collor administration. But once that period of difficulties has ended, the Navy and National Commission for Nuclear Energy (CNEN) will speed up the measures they have been taking to strengthen the country's technology in the production of nuclear fuel on an industrial scale and thereby supply its atomic plants.

According to Rear Admiral Othon Pinheiro da Silva, chairman of the Coordinating Committee for the Navy's Special Projects (COPESP), 1991 will be a decisive year for releasing many of the low-key projects which will be maintained throughout the year. That is the case of three small demonstration plants—the stage immediately prior to production on an industrial scale—which will be built at the Aramar Experimental Center, maintained by the Navy in Iperó, in the interior of São Paulo.

One of the plants will be designed to convert yellow cake (concentrated uranium paste) into hexafluoride uranium gas, one of the raw materials used in replenishing the ultracentrifuges which enrich the uranium. This stage in the cycle of nuclear fuel is currently being developed on a laboratory scale at the Institute for Nuclear and Energy Research (IPEN). According to the rear admiral's calculation, the miniplant will take about two and a half years to complete and put into operation.

According to him, January of this year will also see the initial construction of a demonstration miniplant for the enriching of uranium, the last stage in the fuel cycle. It is expected to be completed in 1993. The third will be a plant for the reconversion of enriched hexafluoride uranium gas, which leaves the ultracentrifuges in the form of uranium dioxide. The dioxide is used in the manufacture of tablets which will form the fuel element and, in turn, fuel the reactors.

The rear admiral estimates that in four years the technology for initiating the industrial production of nuclear fuel will be fully completed.

Santana Replaces Nazareth as CNEN Chief

90WP0063B São Paulo O ESTADO DE SÃO PAULO
in Portuguese 22 Mar 90 p 11

[Article by Tania Malheiros]

[Text] Rio de Janeiro—Physicist Rex Nazareth, 52 years old, one of the principal advisers of the Brazilian parallel nuclear program, was relieved yesterday from the position of chairman of the National Commission for Nuclear Energy (CNEN). He will be replaced by physicist José Luis Santana, brother-in-law of Federal Deputy

Prisco Vianna (PMDB) [Brazilian Democratic Movement Party]. Santana was secretary general of the Ministry of Housing and Urban Affairs, official of FINEP (Funding Authority for Studies and Projects) and of CNEN's Institute of Radio Protection and Dosimetry (IRD) which he left 4 years ago due to incompatibility with Nazareth.

The dismissal of Rex Nazareth was handled by the secretary of strategic affairs, as he himself admitted yesterday. His ousting was received with surprise by the nuclear physicists and engineers who comprise the directorate of the commission. Everyone believed that he would remain in that position because of his considerable knowledge of the secrets involved in the parallel nuclear program. Moreover, his friendship with the military, such as Admiral Mario Cesar Flores, minister of the navy, and General Rubem Bayma Denys, former head of the military cabinet, also suggested the possibility of his continuing as chairman of the CNEN.

Nazareth managed to maintain illegally in his name—and in that of Reserve Colonel of the Army Carlos Lemos de Campos, a CNEN official—a secret account, the Delta Tres, which dealt fraudulently with public money secreted from the Bank of Brazil, funds intended for use by the parallel nuclear program. The account contained the address and private telephones of Col Lemos in Copacabana. In the chairmanship of the organization since September 1982, Nazareth declared that he is leaving "tranquil and with his duty accomplished." Yesterday his colleagues spent the day bidding the former chairman good-by. Most of them felt that he was visibly distressed. "I do not know where I shall go. I had never concerned myself with that aspect. I entered the CNEN poor, as a recipient of a scholarship, in 1960, and I can assure you that I am leaving just as poor," Nazareth asserted.

Difficulties in the relations between Nazareth and Santana began about 5 years ago when the new chairman of the CNEN was working with the IRD. Santana tried to assume certain responsibilities and was prevented from doing so by Nazareth. Two years ago, upon occupying the post of acting minister of housing and urban affairs, Santana made it a point to visit the commission and was received by Nazareth. Shortly thereafter, he paid a visit to the IRD, where he arrived almost 2 hours late, awaiting Nazareth. "I hope that my replacement will be very successful," said the former chairman of the CNEN.

Santana is not known by the scientific community and does not know, for example, what position he is taking concerning the parallel program and the outcome of the nuclear plants Angra I and II. "I hope that the CNEN will continue to show its arsenal of competency on behalf of Brazilian society and never permit the nation to be dependent on other countries," he said.

CNEN President Interviewed on Nuclear Policy

PY1904134990 Sao Paulo FOLHA DE
SAO PAULO in Portuguese 16 Apr 90 p A 6

["Excerpts" of interview with National Nuclear Energy Commission President Jose Luiz de Carvalho Santana by Regina Eleuterio; place and date not given]

[Text] [FOLHA DE SAO PAULO] What will the new government policy be for the nuclear sector?

[Santana] The objective is to discuss the entire program with society. To this end, an interministerial working group has been formed to review the nuclear program. Any change will be in accordance with the Constitution, which places all nuclear activities under congressional supervision.

[FOLHA DE SAO PAULO] When he was a candidate, President Collor declared his government program foresaw the construction of the Angra 2 nuclear plant and the review of the Angra 3 nuclear plant. In that case, can Brazil review its agreement with the FRG?

[Santana] I do not want to say that the agreement can be reviewed, but the construction of Angra 2 and Angra 3 will be discussed by that working group.

[FOLHA DE SAO PAULO] Who will make up the working group?

[Santana] The military ministries, the Infrastructure Ministry, the Foreign Ministry, the CNEN [National Nuclear Energy Commission], the Strategic Affairs Secretariat, the Environment Secretariat, and the Science and Technology Secretariat; there will be observers from civilian sector.

[FOLHA DE SAO PAULO] What is the deadline for the working group to decide on changes?

[Santana] The president will make the decisions. The working group will submit its proposals in 60 days. The group will begin meeting today.

[FOLHA DE SAO PAULO] The physicist Pinguelli Rosa, the coordinator for the Nuclear Program Follow-up Commission, pointed out in a report that the nuclear program has been militarized with the transfer of the CNEN to the Strategic Affairs Secretariat. Do you agree?

[Santana] Not at all. The program has a single civilian coordinator from the Strategic Affairs Secretariat (the secretary, Pedro Paulo Leone Ramos, is a businessman). Nuclear energy is not the generation of energy, basic research, or technological production alone, but a combination of these activities. That is why nuclear energy is a strategic field.

[FOLHA DE SAO PAULO] Is the research being conducted by the Armed Forces indispensable?

[Santana] (Pause) They speak of the militarization of the program. It is not exactly that way. I will not bar any

sector from participating in the development of technology. The Armed Forces are a sector, just like any other.

[FOLHA DE SAO PAULO] But, unlike the official program, the parallel program [managed by the Armed Forces] has no internal nor international supervision.

[Santana] International supervision, never.

[FOLHA DE SAO PAULO] Not even as precondition for obtaining loans?

[Santana] Never. That would be interference in our internal affairs. There is very strong international economic pressure against our technological development in general, exerted by putting conditions on loans.

[FOLHA DE SAO PAULO] The question is that Angra I has international control but there is no control over military research.

[Santana] The Constitution says the nuclear program must be approved by Congress and has to be obeyed. In addition, an interministerial group has authority to review the entire nuclear program.

[FOLHA DE SAO PAULO] Have the contacts been made to obtain foreign loans?

[Santana] No, the entire country is going through changes, and this will influence the international position regarding foreign financing.

[FOLHA DE SAO PAULO] What are the CNEN plans to adapt the enrichment of uranium for commercial use?

[Santana] Our intention is to transfer all productive activities to the private sector. We are studying how to do that because there are activities which allow privatization.

[FOLHA DE SAO PAULO] For example?

[Santana] Uranium enrichment. Brazil has full control over that technology.

[FOLHA DE SAO PAULO] Does that mean that Brazil has the technology to make a nuclear bomb?

[Santana] (Pause) How can I answer that question without creating a controversy? (pause) We never thought of making that decision. The Constitution forbids nuclear activities for nonpeaceful use, and this is why that question should not be asked. Brazil will in no way manufacture the atomic bomb.

[FOLHA DE SAO PAULO] Has the CNEN already decided where to store the atomic waste?

[Santana] The storing of the waste is a top priority, but I cannot tell you yet what we are going to do. We do not want to hide anything.

[FOLHA DE SAO PAULO] Even regarding the parallel nuclear program?

[Santana] Including the black [preceding word in English] areas. I believe in complete clarity and in submitting everything on our activities for Congress' review.

[FOLHA DE SAO PAULO] Therefore, you agree with civilian technical inspections, including the Aramar site?

[Santana] At any of the installations. Legislation gives us the responsibility of controlling the nuclear sector, and that is what we are going to do. I know of the horror that exists in hospitals and university laboratories because I am a professor and I know how radiation is dealt with. It is not a question of being a harsh inspector, but we must increase the fines and inspections of the approximately 2,000 institutions and industries that use nuclear energy. It is society that must appraise the risks and benefits when we accept and use technology.

No Justification Seen in Not Signing NPT

90WP0056A Sao Paulo O ESTADO DE SAO PAULO in Portuguese 25 Feb 90 p 3

[Editorial: "The New Foreign Policy—Conclusion"]

[Text] One of the main items in the new foreign policy—let us call it that—to be implemented by the Collor administration is a revision of Brazil's position with respect to the countries belonging to the nuclear club, the result being a decision to sign the Nuclear Non-Proliferation Treaty, commonly known as the NPT. It matters little whether that decision has already been made by the president-elect or will be made only after a task force to be set up at the Ministry of Foreign Affairs completes its work. Based on the logic governing relations among the various organizations making up the Brazilian state (which, it is true, remain to be set up in their final form), the very fact that President Collor intends to have the NPT problem discussed by a task force set up within the Ministry of Foreign Affairs rather than the Advisory Secretariat of National Defense (SADEN, which replaces the General Secretariat of the National Security Council) indicates that the future administration has decided to deal with the issue in the diplomatic rather than the military sphere. That being the case, it is more or less possible to predict the outcome of those discussions.

In yesterday's editorial, we said that revision of Brazil's posture with respect to the NPT was a serious matter. Today we need to explain why and also to make our position on the matter clear.

The Geisel administration's diplomacy was marked by a number of controversial stands, all of them inspired by a plan which could be characterized as power politics, regardless of how reluctant the Ministry of Foreign Affairs has always been to accept that description. And power politics requires a number of preconditions, the most important of which is the ability to impose one's will on others. Geisel's policy was characterized by a number of stands: aloofness from the United States

(expressed in the anti-Zionist vote, denunciation of the Brazil-U.S. military agreement, and recognition of the MPLA [Popular Movement for the Liberation of Angola] government in Angola); the challenging of Argentina—almost to the point of confrontation—to assert Brazilian supremacy on the continent; closer relations with the Arab countries; the attempt to build a base of support in the Europe of the Common Market; and, the nuclear agreement with the FRG.

While some of those postures had the blessing of the United States, which took no steps to reverse them—especially in view of the Kissinger-Silveira agreement, which sealed a new relationship between Washington and Brasilia—the nuclear agreement with the FRG did nothing but help stir up feelings and led both the State Department and the Defense Department (not to mention the White House) to keep an even closer eye on Brazil's efforts to achieve autonomy in mastering the nuclear fuel cycle. The United States was not worried by the fact that Brazil might learn to enrich uranium but by the possibility that we would be able to stock plutonium, regardless of how it was produced. The United States was afraid—as were other countries, incidentally—that Brazil might build an atomic bomb and become one more factor for instability in the world. The Navy's development of the parallel program with a view to building a nuclear-powered submarine at a later date served to increase suspicions, although scientists and engineers knew that the enrichment level achieved in laboratories supervised by the Brazilian Navy would never permit the fabrication of a nuclear device. Other little-known projects also being developed by the military may have aroused curiosity and fear in some nations. That may explain why Gorbachev made it a point to include an explicit reference to the need to prevent nuclear proliferation in the final communique concerning President Jose Sarney's visit to Moscow.

It would be wrong to identify Brazilian efforts to achieve autonomy in that sector with the Geisel administration. Strictly speaking, a desire to ensure that Brazil was not prevented from exploding nuclear devices for peaceful purposes could already be identified in the Castello e Branco administration. That desire became crystallized under the Costa e Silva administration, when a firm decision was made not to ratify the NPT, which was said to be the instrument by which the world was divided into two parts: the nuclear nations (the United States, the Soviet Union, Great Britain, France, China, and India) and everybody else. And besides—this was the rhetoric employed by many Brazilian diplomats—the NPT served to firmly establish the U.S.-USSR condominium in a divided world.

Leaving aside the rhetoric of power politics or resentment, what was so seriously wrong with the NPT that the administrations throughout the period from Castello to Figueiredo (and Sarney to boot) refused to sign it and did so, moreover, with such energy that the successive U.S. administrations after 1968 (the year when the treaty was signed) felt compelled to exert pressure on Brazil to sign

it? Actually, the basic feature of the NPT is that it puts the signatory countries under the obligation not to produce materials considered "sensitive," or fissionable, and to make all their nuclear facilities available for inspection by the International Atomic Energy Agency [IAEA]. In addition, the signatories to the NPT pledge not to use materials subject to IAEA safeguards for the purpose of nuclear proliferation. From the moment that a government refuses to accede to the NPT, the international community has reason to suspect that that government wants to produce nuclear materials for non-peaceful purposes. That is the logic behind power politics. And the Soviet Union and the United States, which do not want nuclear proliferation, are masters—*cum laude*—at power politics.

The refusal by Brazilian administrations since 1968 to sign the NPT is due in large measure to the dominant influence of the former General Secretariat of the National Security Council [CSN], and now of SADEN, on decisions regarding matters considered to affect—or said to affect—national security. The fact is that while the question of Brazil's accession to the NPT may be a matter of national security, it is, more than anything else, a matter of major national policy. It would only become a matter of national security if the Brazilian Government made a clear decision to produce nuclear devices for peaceful purposes—which is the elegant way of producing the detonator for an atomic bomb. If the intention exists to produce that chimera known as a "nuclear device for peaceful purposes" (despite all the agreements restricting nuclear tests), and in view of the repeated assertion that there is no intention to build an atomic bomb, why refuse to sign the NPT?

In light of the past and of the Army's dominant position in the General Secretariat of the CSN and now in SADEN, that refusal can only be seen as demonstrating that Brazil is refusing to adhere to the rules established by the "superpowers" and "big powers" to prevent world destabilization. Its refusal would mean the survival, so to speak, of the Geisel administration's power politics, which no longer has any base of support in practically any area, largely because during that period, the Ministry of Foreign Affairs got lost in the entanglements of Third-Worldism. Another justification could be described this way: despite all the tearful declarations of love between the governments in Buenos Aires and Brasilia, Argentina has not only not signed the NPT, but so far has also refused to ratify the Treaty of Tlatelolco concerning the denuclearization of Latin America, something which Brazil has done. Conspiratorial as it may seem, that justification gets a good reception in Brazilian general staffs—even though it is known that while Argentine technological development has made it possible (according to some people) to accumulate (small) stockpiles of plutonium, this does not mean that Argentina is capable of producing a nuclear device industrially. Those are the only reasons there are for not subscribing entirely to the will of the superpowers—unless it is known for certain that South Africa already has a (clean!) atomic

bomb and unless it has been established that the NPT will not be signed until significant comparative advantages have been obtained.

There is nothing, with the exception of questionable strategic reasons, to justify a Brazilian refusal to sign the NPT—if it is true that there is some validity to the constitutional precept that no nuclear weapons will be produced and that the nuclear program is to be under the control of the National Congress. Actually, the NPT does not prevent the Navy from continuing to build its nuclear submarine, which will not be ready for another 20 years. What the IAEA will do through its officials is bedevil those working on the program in Iperó or on other programs which the nation is not yet completely aware of. In the nuclear area specifically, and despite what the NPT says, Brazil will receive little in the way of technology subject to safeguards, according to IAEA inspectors.

So the way things are today, signing or not signing the NPT is purely a political issue. If the future Collor administration expects to someday have a seat in the select club of decisionmakers, it will have to keep in mind that in that club, it is the unanimous will of the members that no nation besides those belonging to the club be able to possess either military or peaceful nuclear devices. That is an unnegotiable condition laid down by the United States, the Soviet Union, Great Britain, and France. China may have a different opinion, since in its view, the world is still limited to its zone of immediate geographic influence—and it would certainly be happy if Pakistan could bedevil India, thus changing a balance of power that has remained unresolved since the 1950's.

If that is the case—if signing the NPT can yield political dividends—why not sign the treaty? Let the opponents speak! We believe that the spirit which has presided over our foreign policy since the time of Costa e Silva is

slowly being replaced as a result of the new winds blowing over the East and the West. It needs to be realized, however, that as soon as Brazil signs the NPT, it will have buried for good the panache exhibited by Geisel and Silveira throughout General Ernesto's administration. In other words, the Ministry of Foreign Affairs will have definitely established the doctrine that the power politics which may have been pursued by Brazil is an outdated concept and that the idea of conflict has been permanently replaced by that of cooperation in terms of law. Even if that law was established by power politics.

CUBA

Nuclear, Cultural Agreements Signed With India

*FL1004220490 Havana Radio Reloj Network
in Spanish 1945 GMT 10 Apr 90*

[Text] It has been officially announced that Cuba and India signed in New Delhi a document extending cooperation for the peaceful use of nuclear energy for four years.

During a news conference, Cuban Foreign Minister Isidoro Malmierca, who is heading an official Cuban delegation in New Delhi, said Cuba and India also signed cultural and sports cooperation agreements.

Malmierca stated that India has been training Cuban scientists in the peaceful use of nuclear energy and in the fields of agriculture and medicine, among other areas.

Malmierca stressed that the results of the new cooperation agreements in the various economic, technical, and scientific fields will benefit the two countries and that cooperation in other areas on which the two countries have been working—such as tourism, nuclear energy, science, culture, and sports—will be increased.

INTERNATIONAL

Arab Union Finishes Meeting, Issue Statement

JN1904145690 Baghdad INA in English 1410 GMT
19 Apr 90

[Text] Baghdad, Apr 19 INA—Arab parliamentarians had announced their resolute and strong stand by Iraq in defence of its legitimate national rights and dignity of the Arab nation.

In a final statement issued at the conclusion of meetings of the extraordinary session of the Arab Parliamentary Union Council today, the parliamentarians denounced the decision passed by the European Parliament on the 5th instant, targetting Iraq and the Arab nation.

In their statement, the Arab parliamentarians demanded the European Parliament to reconsider its decision as being considered a bare faced interference in Iraq's internal affairs and also demanded it to conduct fact-finding process prior to adopting any resolution concerning the region.

The statement said that the Arab Parliamentary Union feels deep concern over the unjust campaign engineered against Iraq by the United States, Britain and Israel for distorting its international picture and aborting its national accomplishments.

It added that the campaign was not after harming Iraq but also after keeping the Arab homeland a captive to backwardness and suffering.

It added that President Husayn's recent statements came within the frame of a feeling of high sense of national responsibility that dictates the legitimate defence of Iraqi interests against Western and Israeli threats hostile to Iraq and the Arab nation.

The statement viewed that Iraq's attitude was based on the principle of self-defence and resolve to acquire scientific and technological progress in accordance with principles of international law and norms of dealing among countries including its acceptance of the principle of international inspection of weapons on the condition that other countries of the region including Israel must be subjected to that inspection.

The statement further stressed that a target of the anti-Iraq campaign was also consecrating the Israeli superiority on all Arabs including maintaining Israeli occupation of the Arab territories and continued Israeli and Western hegemony over the region and liquidating the rights of the Palestinian people.

The statement said the Arab Parliamentary Union denounces the European Parliament statement of 5th April which clearly demonstrated that it was not based on facts but coincided with the escalation of the anti-Iraq campaign and the resolution of the U.S. Senate to consider al-Quds [Jerusalem] as capital of Israel which had violated all international charters and resolutions.

The statement also said the union was also following up with concern the suspicious campaign against Libya and stressed its solid and decisive stand alongside Iraq in defence of its national rights and Arab dignity.

The statement demanded the world community to understand the Arab attitude which emanates from keenness on peace and commitment to international resolutions and charters taking into consideration the prerequisites of strategic balance in the region and preservation of national security of all countries.

It also demanded the world community to exercise all forms of pressure on Israel to ensure its signing of the non-proliferation of nuclear weapons and declaring the Middle East a zone free of mass destruction weapons. It also called upon the world community to press Israel for subjecting its nuclear installations to the supervision of the International Agency of Atomic Energy.

The statement called for organizing a meeting between the European Parliament and the Arab Parliamentary Union to exchange viewpoints and expound realities of the situation in the region preliminary to opening a positive dialogue for the common interest of the European and Arab communities.

It also urged Arab parliaments to activate its contacts with the European parliaments to expound realities and to continue the Euro-Arab cooperation in service of the joint interests of the two communities' peoples.

The union sent a telegram of thanks and appreciation and backing to President Saddam Husayn and sent another telegram to the speaker of the European Parliament which referred to the Union's attitude over the unjust resolution passed by the European Parliament.

Arab League Council Assails Anti-Iraq 'Campaign'

Meeting in Tunis

LD0504161190 Kuwait KUNA in English 1323 GMT
5 Apr 90

[Text] Tunis, April 5 (KUNA)—The Arab League Council Thursday started here an extraordinary session at the level of permanent delegates to discuss external threats against Iraq. Meeting at a request from Iraq, the council session was attended by secretary general Chadli Klibi and PLO Executive Committee member 'Abdallah Hurani.

In his inaugural address, Klibi said the campaign by Britain and the U.S. against Iraq was exaggerated and aimed at preparing the Western public opinion to accept a potential Israeli aggression on Iraq for alleged acquisition of weapons of mass destruction.

The league secretary questioned the West's silence over Israel's acquisition of nuclear technology with assistance from the U.S. and recalled that Israel was the first to introduce into the area weapons of mass destruction.

Klibi referred to the recent test-firing by the Zionist entity of the Jericho 3 intercontinental ballistic missile, with a 6,000 kilometer range, Israel's continued refusal to sign the international Nuclear Non-Proliferation Treaty and Tel Aviv's rejection to open its nuclear facilities at Démona in the Negev Desert to international inspection by the Atomic Energy Agency, as Iraq did.

Another aim of the campaign against Iraq, according to the league chief is to undermine Arab relations with the European and other Western groups.

Klibi suggested that the International Atomic Energy Agency undertakes an investigation to assure the Middle East region is free of nuclear weapons and cautioned that the league considers the campaign against Iraq a sort of political blackmail in prelude for a military attack in contravention of international laws.

More on Arab League's Reaction

*LD0504190790 Tunis Domestic Service in Arabic
1700 GMT 5 Apr 90*

[Text] A statement issued this afternoon following this emergency meeting of the Arab League Council held in Tunis this morning, affirmed that the campaigns and statements emanating from official U.S., British, and Israeli circles constitute a grave offense and a serious threat to a fraternal Arab country and member of the Arab League. Such campaigns should rather have been directed against Israel, which has nuclear and chemical weapons and is constantly threatening the security and the safety of Arab countries.

The council urges the international community to work in order to compel Israel to sign the Nuclear Non-Proliferation Treaty and bring its nuclear weapons under the control and the supervision of the International Atomic Energy Authority.

The council issues a reminder on UN Security Council resolution 487 of 1981, which condemned Israeli aggression against the Iraqi nuclear installations.

The council reaffirmed, on the other hand, Iraq's right to possess means for scientific and technological progress within the rights of sovereignty and international law, and condemned any attempt to deprive any Arab country of such a natural right.

The council reiterated in its statement its adherence to the Arab League's charter and the joint Arab defence treaty which have unambiguously pointed out that any aggression against any Arab country is aggression against all Arab League member countries. It warned, furthermore, Israel and all others against carrying out any aggressive act against Iraq under whatever pretext, pointing to the inalienable and absolute right of Iraq and other Arab countries to take the necessary measures to defend themselves and their security and sovereignty.

The council pointed out that one of the aims of the anti-Iraqi campaigns is to divert attention from Israel's

daily crimes against the Palestinian people and its brave intifadah, and also from the conspiracy to relocate Soviet Jews in Palestine and the occupied Arab territories.

The council heard, at this meeting, a report presented by the head of the delegation of the Iraqi Republic in which he pointed out, citing documents and evidence, that Iraq's endeavor to acquire electric capacitors was carried out through legitimate means for use at the University of Technology of Iraq for a scientific program. Moreover, the Iraqi authorities concerned did not contravene the principles of international dealings whereas the U.S. authorities, in coordination with the British authorities, have transformed such a normal act into an intelligence operation to discredit Iraq.

The council affirmed anew that the Arab League member countries must exert all efforts to prevent the harming of Arab-European relations, which have witnessed positive development lately.

'Text' of Arab League Statement

*JN0504212490 Baghdad INA in Arabic 1920 GMT
5 Apr 90*

[Excerpts] Tunis, 5 Apr (INA)—The Arab League Council has warned the Zionist entity or any other party against carrying out any act of aggression against Iraq on any pretext.

At the conclusion of its emergency session here today, the Arab League Council reiterated its adherence to the Collective Arab Defense Pact, which stipulates that any aggression against any Arab state is an aggression against all Arab states. [passage omitted]

The following is the text of the Arab League Council's statement:

The Arab League Council held an emergency meeting on Thursday, 5 April 1990, to discuss the tendentious accusations and the slander campaign launched by official news media in the United States and Britain and the Israeli threats to the Republic of Iraq. The Council heard a report by the head of the Republic of Iraq's delegation. The report provided documents and proof that Iraq's endeavor to obtain high-powered electrical capacitors took place through standard procedures, that they were to be used by the University of Technology in Iraq in a scientific program, and that the concerned Iraqi parties have not violated internationally acceptable rules. Through coordination with the British authorities and a FBI agent within the U.S. company that produces the aforementioned material, however, the U.S. authorities have managed to turn this ordinary action into an intelligence operation with the objective of involving the concerned Iraqi authorities and exploiting the issue politically against Iraq. Moreover, the concerned Iraqi authorities have proved that they adhered to their original request, which was related to scientific purposes at the University of Technology.

The council also viewed with extreme concern the political statements and the unjust hostile and tendentious media campaign against Iraq, whether concerning the execution of a spy who was proved to be spying for Israel, or to the recent case, which has been premeditatedly fabricated and blown out of proportion. The council also reiterated the Arab League member states' concern to make every effort to avoid damaging Arab-Euro relations, which have recently witnessed positive developments.

The council strongly denounced attempts to turn the purchase of an ordinary and small piece of equipment to be used for scientific purposes into a political case to harm a fraternal country, despite the soundness of the Iraqi position. The council blamed the U.S. and British authorities and held them responsible.

The Council also called on the international community to force Israel to sign the Nuclear Non-Proliferation Treaty and to place its nuclear installations under the supervision and control of the International Atomic Energy Authority. In this regard, the council cited UN Security Council Resolution No. 487 of 1981, which condemned the Israeli attack on Iraq's nuclear installations.

The council reaffirmed Iraq's natural right to possess the means of scientific and technological progress within the framework of the rights of sovereignty and international law, and denounced any attempts to deny any Arab country this natural right.

The council noted that one of the aims of the anti-Iraq campaign is to divert attention from the daily crimes Israel continues to commit against the Palestinians and their brave intifadah, and also from the plot of Soviet Jewish emigration to Palestine and the occupied Arab territories.

The council voiced strong condemnation of the campaigns and statements by British, U.S., and Israeli official circles and media, which constitute a serious offense and a dire threat to a sisterly Arab state and member of the League of Arab States, because such campaigns should have been aimed at Israel, which possesses nuclear and chemical weapons and which continues to threaten the Arab states' peace and security.

The council reiterated the provisions of the Arab League Charter and the Collective Arab Defense Pact, which clearly state that any aggression against any Arab state is considered aggression against all Arab League members. The council warned Israel and any other party against committing aggression against Iraq under any pretext, emphasizing the firm and absolute right of Iraq and the Arab states to retaliate against any aggression with any means they deem proper to defend themselves, their security, and sovereignty.

EGYPT

Collective Stand Urged Against U.S., Israel

JN0704222290 Cairo AL-AHALI in Arabic
4 Apr 90 p 1

[Text] Despite the fact that the majority of Arab systems owe allegiance to the United States, it, nevertheless, holds the Arabs to different standards from those it applies to the Israeli enemy.

Arab oil revenues are being amassed in U.S. banks, and those of its allies, and are contributing toward reviving their economies. Nevertheless, the United States never considers the interests and feelings of the Arabs. On the contrary, it grabs every opportunity to arrest any Arab development, whether economic, military, or political.

When Libya proceeded to develop its economic performance and established a factory for chemical medicines, the United States confronted it with a fierce media campaign to arouse world opinion against it, on the pretext that this factory could produce chemical weapons—that is, weapons capable of deterring aggression from Israel, which in actual fact, is producing nuclear, biological, and chemical weapons. The campaign escalated to threats, sabotage, and then arson.

Today, the United States, Britain, and Israel are waging a full-scale media campaign against Iraq, because of its efforts to develop its technological capabilities. Despite the fact that the Iraqi nuclear reactors work within the framework of peaceful development and submit to international supervision, the suspect campaign continues and thus arouses the suspicion that a surprise attack may be planned on the Iraqi nuclear installations, like the Israeli aggression in 1981 against the Iraqi nuclear reactor.

A U.S. intelligence report published by THE NEW YORK TIMES reveals the real reasons behind the campaign. It said that, by developing the Soviet Scud rocket, Iraq would be able to hit targets in Tel Aviv and retaliate for any Israeli raid against its nuclear and industrial facilities—something that runs counter to U.S. plans in the region and would upset its scheme to thwart any real progress by the Arabs, confine advancement to the Israelis, threaten pan-Arab security, and ensure Israel alone has the long arm to oppress whoever upsets American calculations.

In the era of international detente, we should not rely on a foreign power to confront American and Israeli aggressiveness. President Saddam Husayn has done a good job by threatening to burn half of Israel with chemical weapons if it attacks Iraq. It marks a significant qualitative shift in the Arab handling of U.S.-Israeli thuggery.

The question is whether this showdown should be exclusively Iraq's responsibility or that of any one Arab country. This thuggery underestimates and offends all Arabs. Taking a determined stand, therefore, should be a collective Arab responsibility.

Air Survey for Nuclear Power Raw Materials Planned

90OA0376B Cairo AL-AHRAM AL-DUWALI in Arabic
7 Mar 90 p 1

[Text] The Nuclear Material Authority signed a contract for the purchase of the world's most up-to-date aircraft for exploration of underground nuclear materials in order to complete the air survey of nuclear and radioactive materials in Egypt. Egyptian experts will carry out aerial photography and prepare maps of locations containing strategic raw material deposits, and will also detect any incidents taking place at home or abroad.

The 9.5 million pound contract includes the cost of the plane, its complementary equipment, and the training of Egyptian cadres on aerial survey work which will begin in the Sinai this year.

The latest center in the Middle East for the processing of aerial data obtained from the plane has been completed in Egypt. This will do away with the need to send such information abroad and therefore pictures will be more accurate and secret.

Dr. Hasan 'Abd-al-Muhsin, head of the Nuclear Materials Authority, said that aerial survey operations are the foundation of the Authority's exploration work and search for radioactive nuclear material and the accompanying minerals of the various natural mineral deposits, including geological and structural charting and environmental radiation survey in Egypt's eastern and western deserts and the Sinai. Aerial magnetic radiation survey of entire Egypt began in 1958 in cooperation with the Egyptian air force with the use of different types of light aircraft.

The survey of about 25 percent of Egypt's area using radiation, spectral, climatic, and detailed methods and about 40 percent of Egypt's area using magnetic and detailed methods was completed in 1982. Various maps for this area have been completed.

During the survey, nuclear material experts in Egypt have been able to discover three areas containing uranium raw material, in Jabal Qitar, al-Maskat, and Umm Ara. Quantities of uranium deposits have been estimated at 14,000 tons. This is in addition to discoveries in other areas in the eastern desert.

Dr. Ahmad Abu-Bakr 'Ammar, head of the exploration division at the Authority, said that the most up-to-date center for charting and data processing in the Middle East has been completed. It will process data obtained from aerial survey by Egyptian experts so that data on Egyptian land contained in magnetic tapes will remain secret.

INDIA

Western Allegations on Pakistan Bomb Quoted

51500086A Madras THE HINDU in English
19 Feb 90 p 7

[Text] New Delhi, 18 Feb—Western intelligence agencies have reported that Pakistan has six atom bombs of the size of the one dropped on Hiroshima and is preparing to make an even more powerful bomb, a Pakistani newspaper has reported quoting a U.S. publication.

Pakistan has tested its first atom bomb about one-and-a-half-years ago and is now trying to install a reactor to produce plutonium required for making atom bombs, NAWAI WAQT, quoting U.S. NEWS AND WORLD REPORT, has said.

It is said that bombs made of plutonium are smaller in size than those using uranium and hence easier to use. Pakistan is also said to have started installing a new nuclear station near Golva.

The strategic environment around South Asia in the Nineties, defence analysts think, will be increasingly determined by the postures of a nuclearised Pakistan.

A couple of months ago it was reported that Pakistan had an atomic bomb and was likely to test it, possibly in China. The bomb was described as deliverable by F-16 fighter bombers.

F-16's have the necessary "hard point" fixtures to carry the bomb, though the U.S. has made sure that electrical connections for making the bomb ready in mid-flight were not being delivered.

It is believed that Pakistan, disregarding its agreements, has started making such modifications in F-16 fighter planes as would enable them to be used for dropping atom bombs.

The Pakistani scientist, Dr. Abdul Qadir Khan, was also said to have claimed that they could make a hydrogen bomb. This, experts say, cannot be taken lightly, since uranium enriched to 90 per cent is suited to "trigger" a hydrogen bomb, and Pakistan has procured from West Germany a plant to produce tritium.

Pakistan, experts feel, can maintain a posture of ambiguity and stockpile weapons even without conducting any test, since enriched uranium weapons in gunbarrel mode need not be tested.—PTI

Nuclear Scientists Speak at Indian Science Congress

51500085A Madras THE HINDU in English
9 Feb 90 p 4

[Text] Cochin, 8 Feb—The Atomic Energy Commission (AEC) is examining sites in Kerala for establishing a nuclear power plant, according to Dr. P. K. Iyengar, Chairman of AEC and Secretary, Department of Atomic

Energy. He said this on Wednesday while addressing the Science Congress in progress here.

The plant required only a small extent of land, was environmentally "benign" and hence better suited for the densely populated State than a thermal power plant, he said.

Kerala would get its share when the nuclear plant at Koodankulam in Tamil Nadu came up. In asking for a nuclear plant in Kerala itself, the State Government was probably looking at future power requirements as well, Dr. Iyengar said in reply to a question.

"Nuclear Fuel From Moon"

Dr. Iyengar said there were possibilities of extracting nuclear fuel from the surface of the moon. The U.S. and the USSR were seriously considering mining the moon's surface for Helium-3, an isotope of helium not found on earth. Helium-3 does not leave any radioactive waste behind. Used as nuclear fuel, it becomes ordinary helium, giving off energy in the process.

The moon's surface has millions of tonnes of Helium-3 and both superpowers had plans to stockpile it, Dr. Iyengar said.

Referring to cold fusion, he said it is "energy which can be produced in a garage" but admitted that the process would have to be fully explained before practical exploitation could be embarked upon.

Though there was still considerable disagreement about cold fusion, research here had shown that tritium (an isotope of helium) was the main product.

Fusion reactors, which would duplicate processes in the sun to produce enormous quantity of energy, were proving extremely expensive to develop. As a result, the U.S., the Soviet Union, the European nations and Japan had embarked on a joint programme to develop fusion reactors in 10 years' time. In India, the concentration was on using the vast thorium deposits. The country had just 45,000 tonnes of uranium deposits against 350,000 tonnes of thorium. Natural uranium would fuel the pressurised heavy water reactors. The plutonium produced would fuel the fast breeders which would also irradiate thorium to produce uranium-233 which could then be used as nuclear fuel.

In its attempt to triple the installed power generation capacity, the share of nuclear power in the country would unavoidably increase, Dr. Iyengar maintained.

"Cold Fusion or Confusion?"

"Is it cold fusion or confusion", asked Dr. J. C. Krupa, a French nuclear physicist attending the Congress. The director of research at the University of Paris Institute of Nuclear Physics, currently a visiting scientist at BARC, he was addressing a press conference on Thursday.

He said that in France, several experiments had been conducted seeking evidence of cold fusion. "We have seen nothing". Though a powerful neutron detector had been used, no neutron production had been noticed. No tritium had been found either.

Asked to comment on Indian experiments which claim to have found irrefutable evidence of cold fusion, Dr. Krupa would only say that much higher electricity (60 Amperes) had been used by the Indians. Perhaps this had something to do with it.

Even if cold fusion was a reality, its practical application was open to doubt. The question was how much more power the system could produce compared to the amount of power put in. (Cold fusion is said to occur during the electrolysis of heavy water using palladium electrodes.)

"In my opinion, even if cold fusion is viable, it cannot be used for commercial energy production", Dr. Krupa said. "Cold fusion is likely to remain a table-top experiment."

Caution on Nuclear Energy

He also had some words of caution about the use of nuclear power. While the technology for nuclear power generation was well-developed, the human factor could not be ruled out. The Chernobyl accident was a case in point. The problem of nuclear waste also could not be brushed aside. Nuclear reactors provided radioactive waste, not fumes, dust or carbon dioxide. Such wastes remain a problem for several generations. When waste had to be stored for hundreds of years, leakage could not be ruled out.

In France, low-level wastes were being stored in surface repositories. High-level wastes were entombed in steel and concrete, and then buried in granite rock layers hundreds of metres underground. Research was continuing on what would happen if leakage occurred.

Nevertheless, for all its hazards, exploitation of nuclear power was inevitable, Dr. Krupa believed. France had no fossil fuel and hence relied on nuclear power for 70 per cent of its electricity generation. "You cannot do without nuclear power. You need electricity and nuclear power must necessarily be used", he added.

IRAN

Commentary on Iraq's Nuclear Efforts

*LD0404194990 Tehran Television Service in Persian
1730 GMT 4 Apr 90*

[Unattributed commentary]

[Excerpt] The recent media sensationalism concerning the failure of Iraq to buy triggers for nuclear bombs, as well as Saddam's own reaction, are among new and interesting topics which unveil many facts.

In this seemingly complicated development, the regime ruling over Iraq has stood against countries that support it in what one may call a news and words warfare. In its reaction to its failure to acquire nuclear bomb triggers, the Iraqi regime reveals a number of important and yet questionable issues.

Of course, reading from a prepared text, the head of the regime ruling over Iraq utilized various axes to tone down possible international reactions. However, despite such precautions, as is expected, he reveals interesting facts. The unveiling of the fact that the United States and the UK were previously making efforts to arm Iraq with nuclear weapons is among that facts world public opinion has been made aware of during the current episode. So is the fact that the intelligence agents of the United States, the UK, and Israel, in their visits to Baghdad, had encouraged the head of the Iraqi regime to buy enriched uranium.

That issue apart, the confession that Iraq possesses missiles armed with chemical weapons is among important points which, following many years, now make nonsense of all the previous mendacious propaganda, even more so when one realizes that the use of those weapons inside Iraq, especially in the sad events of Halabjah, known as the second Hiroshima, reveal as lies the fresh claims that such weapons are for defense. In fact, the necessary ground for the Iraqi regime to admit explicitly, in the present international atmosphere, to the manufacturing and stockpiling of chemical weapons was prepared at the time when the biggest producers of nuclear weapons acquitted the Iraqi regime of all wrongdoing during the Halabjah events, trying to change the political atmosphere in favor of that regime.

Perhaps during the current sensationalism, the existing hatred in the region against the Iraqi regime would not have been created had the weapons—which the Iraqi regime admits to manufacturing and stockpiling—not previously been used against the innocent people of Iraq and in that regime's aggressive war against Iran. It might then not have brought about the strong reaction of the Iraqi people against the Iraqi regime.

Saddam's confessions that he continues to manufacture and arm his army with chemical weapons will serve to inform world public opinion and independent circles of the validity of the views and assertions of the Islamic Republic of Iran regarding the fact that Saddam is irresponsible and harbors antihuman intentions. [passage omitted]

Discovery of Triggers Called 'Propaganda Stunt'

NC1204165290 Tehran JOMHURI-YE ESLAMI
in Persian 5 Apr 90 p 1, 11

[From the "Weekly Political Analysis"]

[Text] The propaganda clamor about the smuggling of nuclear weapons [as published] for Iraq was one of the main international issues of the week. The U.S. and

British security forces claimed that they had prevented the transfer of some sensitive electronic devices to Iraq. They said that these devices could act as "explosion triggers" in nuclear weapons and that with their transfer to Iraq a major part of the requirements for offensive nuclear weapons could be met.

Subsequent reports endeavored to minimize the importance of the above components, claiming that they were "electronic condensers." However, the reaction of the Baghdad regime, Israel, and the United States on the subject conveys an entirely different impression. Israel announced that it would deter Iraq from gaining access to nuclear weaponry, which it would destroy as it destroyed the "Tammuz" nuclear power station [nir-ugah].

Meanwhile, the Baghdad regime threatened that, if Israel carried out such an attack, it would retaliate by attacking Israel with binary chemical weapons. Later Saddam made a further revelation, stressing that the United States, Great Britain, and Israel have consistently endeavored to equip Iraq with nuclear weapons. He said that the United States, Great Britain, and Israel were constantly in touch with Iraq and wanted to sell it enriched uranium and even complete nuclear weapons.

In tandem with these allegations, the "ABC" U.S. television network reported on the direct role of the United States and some other Western countries in the manufacture of ballistic missiles, which are capable of transporting chemical and nuclear warheads, for Iraq.

Taken together, the above allegations and reports, in light of the extent of the Baghdad regime's affiliation to these regimes, lead one to draw certain conclusions. It is evident that the West has a definite presence in the fabric of the Iraqi ruling system, especially in view of the decisive role played by the West in preserving and perpetuating the bestial Iraqi regime. In such circumstances, claims that the United States, with the help of Great Britain, has been trying for the past two years to lay a trap in order to catch the Baghdad regime red-handed, as it was aware that Iraq was covertly striving to gain access to nuclear weapons, seem utterly ludicrous.

The Satanic powers' role in equipping the Iraqi war machine, with chemical weapons in particular, is not a point that even the West can refute. The Western governments try their utmost to attribute such attempts to "private companies" and pretend to be totally detached from such matters. However, all facts and figures point to the active and guiding role of Western governments, especially those of the United States and Great Britain, in such matters.

In light of all this, what were the objectives of the initiation and continuation of this recent propaganda stunt? Is it intended to be a humiliating exposure to harm Saddam, by means of which the West wishes to exert effective political and propaganda pressure on him? Is this a British-style form of revenge that the

London government is taking for its disgrace and Saddam's disobedience in the "Bazoft" affair? Or are the West and the supporters of Iraq attempting to instill some new elements into the Iran-Iraq peace talks on the eve of the latest round and thus to change the propaganda atmosphere surrounding these talks? Is it that Saddam—whose savage policies were to be supported and strengthened as one of the principles of Western policy—has got "out of control" from the Western point of view and that his supporters are endeavoring to crush and destroy him and his regime?

These and scores of other questions comprise the several probabilities which arise if the various aspects of the issue are considered. It is possible that ambiguous answers may be given to such questions, but in any case it is a clear fact that the malicious exposure on the part of the United States and Great Britain in this regard is not confined to the points mentioned above. There are a number of other implications that will become clear with the passage of time.

IRAQ

Industry Ministry Comments on Capacitors Incident

JN1704135290 Baghdad INA in English 1115 GMT
17 Apr 90

[Text] Baghdad, 17 Apr, INA—A responsible source from the Iraqi Ministry of Industry made the following statement to INA in reply to the indictment issued by the Southern District of California and published by some international news papers.

The Court of Southern District of California has issued its bill of indictment No. 90.0211 on March 23rd 1990, against the following subjects:

1. 'Ali 'Ashur Daghir
2. Karim Ghaydan 'Umrin
3. Walid 'Isa Ahmad
4. Jeanine Speckman
5. Zahir al-'Azzawi
6. Euromac (London) Limited
aka European Manufacturer Center, Ltd.
7. Atlas Equipment (U.K.) Limited.

As there is no legal connection between al-Qa'qa' General Establishment (the employer of ser. 2,3 and 5 above) from one side, and ser. 1, 4, 6 and 7 from the other, hence the contents of this memorandum is related to serials 2,3 and 5 only.

1. The bill of indictment stated that the contracted items are "nuclear warhead detonation capacitors" based on the technical specifications of those items.

Describing the item required by al-Qa'qa' General Establishment as being used for nuclear purposes is completely untrue. As:

A. The required items were merely capacitors that were contracted to be purchased for use in constructing CO2-laser system by the university of technology for its own research purposes, this university has issued the relative formal end user certificate.

B. The choice of those capacitors was made out of the American manufacturer csi-capacitors product catalogue, the appropriate model chosen was (E5) as designated in the catalogue which is used for laser applications, the model and quantity were confirmed through al-Qa'qa' telexes Nos. 119 and 2975 dated Jan, and May 31 1989 respectively.

C. The a/m capacitors have wide range of well-known technical applications, such as:

- Various laser system applications.
- Stage separation systems applications in rockets and space shuttles.
- X-ray system.
- Radar and communication system.

The object of selecting American military standards for specifications was to insure precision, compactability [as received] and quality of performance.

2. It was claimed that the Iraqi side has attempted to smuggle the contracted items illegally, while not acquiring or even applying for relative export license:

Al-Qa'qa' General Establishment one of Iraqi Ministry of Industry bodies, has formally agreed with the British company (Euromac) on supplying a number of capacitors with total amount of (10,500) U.S. Dollars after studying various offers presented by various foreign companies.

The Establishment as the (buyer) is not responsible for acquiring export licenses from other countries, according to American laws and international trade customs as well as Incoterm [expansion unknown] rules issued by the International Chamber of Commerce in Paris. As this is the sole responsibility of the supplying company (the seller). Thus we see that the general conditions of contracts often include that "standard conditions" which deems the seller responsible of acquiring the export licence from the competent authorities.

In this case, Euromac and the sub-supplier CS² are responsible of acquiring those licences (if necessary).

Moreover, the buyer is not in a position to know what items and what countries [are] subject to export restrictions, as they vary from country to country depending on types of products and political relations, which makes it difficult for the buyer to know what is restricted or not. Sometimes it is difficult even for the seller himself especially in the U.S.A., and it was experienced on many occasions that the American supplier is unable to confirm acquiring export licenses for the contracted material (if required) and in many cases, the American supplier postpones export licence application until the date of shipment, then, he would contact customs authorities to get necessary information and to act accordingly.

Trade relations indicate many cases where the buyer considers inability of the seller to export the material due to his inability to obtain necessary export licences as failure to commit to his obligations, consequently the seller is held responsible for all consequences. In return we note that the seller often rejects such obligations, due to the fact that he only can do his utmost best to try to obtain required licences but he cannot guarantee acquiring it or even to keep it valid until concluding his contractual obligations.

In many cases, the seller did fail to obtain necessary export licence after signing the contract and issuing l/c's and even executing the down payment. Then both parties are forced to settle the matter either in an amicable manner or through the competent court (if necessary).

In this case before our hands, the Establishment has signed a formal contract with British company (Euromac) which in its turn contracted the American sub-supplier CSI. Hence its the responsibility of the two latter companies to indentify whether the contracted material requires export licences, and if so, take the necessary arrangements to obtain them according to the prevailing laws in supplier's country.

The Establishment did not, and could not violate export laws as it is not the concerned party in such transaction.

The supplier has full liberty to sign the contract from the beginning, and is committed then to contact concerned customs authorities to get acquainted with the procedures required for the contracted material and to make sure whether export licence is needed for this very item or that.

There is no ambiguity in this case, and the Establishment has acted clearly and openly. It did not conceal its contract nor did it use covered correspondence procedures.

All correspondences concerning this subject were conducted through normal telex lines which are subject to constant monitoring and tapping procedure from concerned authorities as it is well known. Nor did the establishment conceal the nature of the contracted material or its application or its end-user.

It is clear, that the competent authorities in supplier's country has the right to reject granting export licences according to prevailing laws when being informed by the seller with his wish to export the material, but it has absolutely no right to get transaction as a party with the objective of trapping and defaming.

There is nothing in the internationally recognized principle of laws that allows the executive authorities to encourage or to support any subject, person or company or whosoever to act in violation to the prevailing laws with the objective of trapping that subject and then arresting him. This policy, in addition of being illegal, fully contradicts with moral laws that bind the state and

its bodies to guide its citizens and others to distinguish between what is right and what is wrong according to its prevailing laws.

The Establishment conducted all its activities in goodwill with both the supplier and the sub-supplier starting from signing formal contract and introducing end user certificate up to using open telex lines for correspondences and attending a meeting in London with accepting the idea of setting another meeting in the U.S.A.

The clear legal position of the Establishment cannot be spoiled through claims that Euromac being an agent or a purchase office for Iraq, or that this company is acting on behalf of the establishment. Since those claims are completely false. The subject 'Ali 'Ashur Dagher is a British citizen of Iraqi origin. He is also the manager of a British company working for its own with no direct or indirect connection to the Establishment or any other Iraqi governmental entity.

The relation between the Establishment and this company is strictly contractual relation based upon simple and formal trade deal.

Contracts often indicate that the supplier is not considered as agent or an employee of the buyer as a result of those contracts, which is a very well known fact in international trade transactions, hence, 'Ali 'Ashur Dagher can never be considered an agent or a representative of the Establishment nor can it be held responsible of what he does or says which is the sole responsibility of his own.

Therefore, there is no way that the Establishment could be held responsible for the telexes and telephone calls between 'Ali 'Ashur Dagher and other persons or companies, or be considered approved by the Establishment.

3. Transfer of amounts to U.S.A. to finance illegal deals.

Those transfers were made according to formal contract in order to pay the American sub-supplier CSI. The transfers were made in fully open and clear manner with no secret or illegal intentions. Hence, there is no violation to the law by the Establishment whatsoever.

Saddam Comments on Binary Chemicals, Missiles

JN1904095290 Baghdad INA in Arabic 0620 GMT
19 Apr 90

[Excerpts] Baghdad, 18 Apr (INA)—President Saddam Husayn has reaffirmed we are a nation with the right to live not only to eat, but to fulfill our distinguished human role, as the history of our forefathers has taught us. He added: We also are carrying out our distinguished human duties, not only the natural ones, because we are building strong pillars for a nation that was honored by God to be the nation of prophets and the Koran.

President Saddam Husayn said this while receiving delegations of workers participating in the emergency

meetings of the Central Council of the International Confederation of Arab Trade Unions this morning. [passage omitted]

The following is the text of President Saddam Husayn's address: I hope Ramadan will be a blessing to you all. We ask God to let us always celebrate Ramadan in dignity, prosperity, and success. We also ask God to let mankind, or those who do not hate the Arabs wherever they may be on this earth, to bask under its auspices and enjoy its bountiful offerings.

Greetings to all Arab workers in their city, Baghdad, and in their country, Iraq. This is because Cairo, Algiers, Jerusalem, Damascus, and the other Arab capitals and countries constitute our homeland.

You have convinced me and the Iraqi people, who are your people, of the soundness of our stand. I therefore will not burden you with terminology and analysis to prove the stand is sound.

As you have told me, and as I have stated in Baghdad and before that in Amman, we have the same human rights as the British, the Americans, the Germans, the Soviets, the Japanese, and the Koreans. [passage omitted]

We have the right to live in dignity, and the right to defend our rights. Any inch of Arab land that has been usurped should be regained. With this in mind, your sacrifices as Arabs in a war they had wished to perpetuate for eight years acquire additional historical meaning in terms of their dimension and impact, when these sacrifices become like jugular veins that meet other jugular veins in the Arab body from the eastern part of the homeland to its western part, from the northern part to the southern part.

Why are some people so disturbed and so blatantly and shamelessly prejudiced against the Arabs? They act this way because they have realized the Arab nation is witnessing a resurgence and renaissance, although in different degrees from country to country—countries that help each other despite the fact they have had different experiments. In the past, the different experiments were a cause of contradictions and conflicts that weakened strength and exhausted resources. The enemies suddenly discover that the diversity of colors and trends and diverse approaches to life do not necessarily give rise to the state of affairs to which they have been accustomed, a state of affairs that always had led to disputes. This time they discovered that diversity constituted a test of which approach was the best, each derived from each one's position and stance but all leading to the same course, which is the Arab nation's interest.

This is the general situation. Their usual bet was that they could coerce Iraq through Israel or someone else, because Israel possessed world experience from World War II [as received]—a war that lasted four years or more—experience the Arabs did not possess. Then they

suddenly found out your humble country, Iraq, possesses an experience of war that gave double the experience of World War II. As pointed out by brother Hasan [Hasan Hajjam, chairman of the International Confederation of Arab Trade Unions] and brother Haydar [Haydar Ibrahim, Union of Palestine Workers], in the pan-Arab sense, this has become an experience for the entire nation, not only Iraq. This is because our steadfastness and fighting in defense of the values, which you know, were based on pan-Arab standards and principles, not on circumstantial and regional standards or limited strategic standards, for that matter.

The entire West used to admire the Israeli brain's success in applying, dealing with, and inventing Western technology, although this Israeli brain is, in fact, a Western brain—or brains—that emigrated from the socialist bloc. Then suddenly, they found that the Arabs, too, can deal with modern arms to an excellent degree and that they actually have managed this technology and given it a national and pan-Arab identity, as brother Haydar has just said.

This is why they have created such a great uproar over the binary chemicals. They thought they could strike us. Well, let them try. War, of course, means inflicting strikes. We have experienced it. We have the experience, and we know what war means. If strikes are concentrated on one target, that target is bound to be hit. So, if a target is hit, we will build 10 others instead. This is because the plant we are using now is not imported. It was imported one way or another in the initial stages, but now we manufacture the plant ourselves. So, what will their strike mean, and what will they strike when the country itself manufactures the raw materials at home?

They want to strike the missiles we have deployed. Yes, it is true we have deployed these missiles and they are directed west, not east; that is in the direction of Israel. If they strike one missile base, what will that mean? Is it the only base we have built? Our missiles are mobile. Today you see them in Baghdad, tomorrow in Mosul, and the next day you launch them from Basrah, al-Sulaymaniyah, or al-Qadisiyah Governorate. We can launch missiles every hour and from different places. For each base they hit or destroy on the ground, we will manufacture and build another one.

They imagine the missile factory exists in Bankalah [placename as received], but the fact is, every piece of the missile is in a different place. We had been engaged in a war for eight years, and we know the facts of war. How can a person who knows the fire consumes gold put his wife's jewelry in a safe in the house, knowing that when they burn his house, he will lose the gold? Is it logical to build missiles in obvious places? In every civilian and military factory, a piece of the missile is made. Will they strike at every factory in Iraq, visible and invisible? They should hold their breath and think again. They should place all Arab rights on the table: Palestine for its people, and Jerusalem for its people. If they claim any right from us, we cannot deny rights of others; we are a nation that

fears God and abides by human values. If we owe rights to anyone on earth, then he can take them; if we owe him a lash, we will turn our back to him so he can give us one; if he has a right concerning anyone of us—even the strongest among us—he will attain it. But those who take our rights should not imagine we will let them sleep without taking our rights back. The time when they stepped on the toes of the Arab nation without anyone telling them not to—by force of action, not words—is now over; it is a thing of the past. If anyone imagines he can build his glory on the rubble of the Arabs, he is mistaken. If anyone thinks he can achieve the welfare of his people and keep the Arabs barefooted, then he also is mistaken. If anyone imagines the Koreans can develop, the Americans can develop, and the Taiwanese can develop, but the Arabs cannot, then he also is deluded.

This sums up our message to ourselves; a message we believe in from A to Z. Our souls and minds absorbed this message before it became a program; it was anointed with blood and gained legitimacy through all the sacrifices you know. We, therefore, cannot change what we believe in. What we believe in is right, and it can be summed up as follows: We are a country that wants to live in the way I mentioned. We are one Arab nation, albeit with various trends and many states. We are one nation, which has the right to live in dignity and pride. Does this reasoning constitute aggression against anyone? This is not aggression, and those who imagine they can perpetrate aggression without retaliation still are living in the past. If Israel thinks Baghdad fears bombs, I say, if this generation is scared, then al-Mansur [Abbasid caliph] may appear and tell us not to be afraid. Baghdad has been struck by bombs and missiles and is experienced in this. Baghdad was the target of bombs and missiles for eight years.

It was attacked for eight years while its children sang for life, nationalism, pan-Arabism, justice, and humanity. If someone thinks if they started a war it would last only a few days, then he also is mistaken. By God, we will not let it be a war of only days.

If they start the war, we have stamina. We will prolong the war. We will allow the Arab who has not responded to the war in its first days to mobilize his potentials and capabilities. If the Arabs do not respond to the war within days, they will respond in within a few weeks. If they do not respond within a few weeks, they will respond in months, and if they do not, we will make them respond in terms of years. Just as Israel imagines it can cross countries to come and strike at Iraq, we also will cross countries and strike Israel. Israel will cross countries, although without the approval of some of them. We, the Arabs, however, have a collective defense pact and under this collective defense pact, the Arab land is one, the battlefield is one, and the armies are one. Missiles do not need land. They can be fired from Iraq. Aircraft need airspace only and no land. Our planes can reach and cover all of Israel. There is no excuse, and no one can find excuses for us.

I would like to explain the characteristics of the weapons we have so you will not see any Iraqi excuses. Our missiles can reach Israel, and our planes also can reach Israel. Israel usurps Palestinian rights but, according to the United States, the United Kingdom, and other countries like them, Israel is not the aggressor.

Israel is committing a crime every day, not only through its usurpation of the land, but through its killing of the Palestinian individual. They, however, do not consider this a crime. There are 23 million Americans who roam the streets searching for their daily subsistence in dustbins. Nor is this considered by them as a violation of human rights.

Blackmailing the Arabs, pilfering their funds, keeping some of them barefoot and while many of them suffer from malnutrition, is not a violation of human rights in their opinion, while the execution of a spy who spies in Iraq for Israel is a violation of human rights. Faced with this comparison, is there anything more humiliating than this to the Arabs to incite them to rise against this Israeli, U.S., or British injustice, supercilious attitude, and beligerence?

Brother workers, we must let the aggressor understand that when he carries out an aggression, all of his interests that we can reach will be threatened. Every one of us should act according to his capabilities. Your capabilities are not meager. I know your capabilities are not meager. I have explained to you the capabilities Iraq possesses so you will find no Iraqi excuses when they fail to reply forcefully to the aggressors.

I affirm here that the Arab workers' capabilities are not meager or limited. The workers are deployed everywhere. In any case, we should take into our consideration that everyone assumes a role from the position he has—the leader from his position, the government too, and the popular organizations, trade unions, and political organizations. Everyone assumes a role based on the position they have. When each of us prepares his role from his position, be certain many of the Arab rights will be regained without resorting to shooting. Rights that cannot be regained but with the gun, we must regain with the gun. When each party defines the course it believes in and proceeds along it, there will be no clashes and no exhaustion of resources.

In the past, clashes used to take place between two parties. They would wage a battle while the foreigner looked on. This or that Arab country used to wage a battle, and the foreigner used to just watch. Now, the threat is as you have described it. I do not want to repeat what our rights are, as you have explained them more than enough.

We have to specify the tasks we are to perform. For our part, we will give you the chance as Arab brothers. If the Israelis strike us once, we will not answer them just once and remain silent. No. If they strike us, we will continue to strike until the remotest capability in the Arab nation is mobilized, to give the Arab nation its chance to

mobilize its capabilities. All the way through, we will ask God for assistance and depend on our rights. We wish you success.

Right of Self-Defense Asserted at Arms Talks

JN0304200490 Baghdad INA in Arabic 1550 GMT
3 Apr 90

[Excerpts] Geneva, 3 Apr (INA)—Iraq has declared it has every right and is dutybound to prepare what is necessary to defend itself and preserve its pan-Arab security according to the principles of international law.

Dr. Rahim 'Abd-al-Kital, Iraqi ambassador to Austria and head of the Iraqi delegation to the meetings of the disarmament conference currently taking place here, has said since Iraq is an independent sovereign country, it has a strong and indisputable right to obtain the technology it needs for industrial, scientific, and social growth, and that nuclear energy for peaceful purposes is nothing other than that.

Mr. Rahim 'Abd-al-Kital added that since the treaty to ban the spread of nuclear weapons provided ways and means to supervise and investigate—a task entrusted to the International Atomic Energy Agency [IAEA]—then the attempt by any party to take the law into its own hands and assign to itself the role of policeman to carry out the supervision instead of the IAEA will diminish the value of the IAEA and greatly abuse its system of guarantees.

The head of the Iraqi delegation warned against the propaganda and deception campaigns brought against Iraq by Britain, the U.S., and the Zionist entity. He said this campaign's only purpose is to pave the way for a new act of aggression against Iraqi industrial and scientific establishments and to contain the legitimate ambitions of the Iraqi people to progress and develop.

He said the continuation of this campaign against Iraq, related to the treaty on banning the spread of nuclear weapons, soon will raise questions about the usefulness of this treaty and will have a damaging effect on the fourth revision conference of the treaty. [passage omitted]

Regarding the current negotiations to reach an international agreement banning the production, storage, and spread of chemical weapons, the Iraqi delegation head said this agreement should contain a binding pledge from the nuclear countries to take measures to disarm nuclear weapons on an equal basis with the disarmament of chemical weapons.

He said the agreement should also, as a first stage, legally bind the nuclear countries not to use nuclear weapons, according to the Geneva protocol of 1952 concerning the banning of nuclear weapon and poison gas use.

On the same topic, the Iraqi delegation head asked the commission be formed within the framework of the

agreement to perform investigation and supervision and to be established on new bases and not along the lines of the existing commission.

He elaborated on this, saying the new commission should guarantee the rights equally for all member states. One country or group of countries should not benefit from the councils of the commission alone, with rights and privileges above those of the other countries. One country for example, cannot enjoy permanent membership unless this right is open to all countries.

He also asked that the commission's administrative and scientific councils be subject to scrutiny so there would be no vague language that could be interpreted in ways contrary to the principle of equality between the member states and their citizens' rights in occupying administrative, scientific, and inspection positions. [passage omitted]

He warned that the continuing current situation does not encourage effective measures in disarmament; no, on the contrary, it will lead to an accelerating arms race in the region. [passage omitted]

The Iraqi delegation head called on the disarmament conference participants to clearly declare their rejection, in fact, their condemnation, of individual measures—whether they are deceptive, threatening, or aggressive—as an alternative to disarmament negotiations.

Paper: Eliminate Israeli 'Nuclear Arsenal'

JN0304131590 Baghdad INA in Arabic 0755 GMT
3 Apr 90

[Text] Baghdad, 3 Apr (INA)—AL-JUMHURIYAH warns the Zionist entity and its allies against embarking on any foolish adventures against Iraq.

The paper adds Iraq has its defensive plans and means of deterrence. The paper goes on to say the Zionist entity must consider its future steps carefully before moving to implement any of them.

In an article published today, the paper says Iraq will not spare itself the duty to defend itself and the nation through using all available means, particularly that the Zionist enemy is being given a free hand to possess the most lethal means of destruction, and its endeavors regarding this are not subjected to any control or monitored by international legitimacy.

The paper calls for eliminating the nuclear arsenal of the Zionist entity, considering this is the proper way to end the nuclear arms race in the region.

AL-JUMHURIYAH calls for placing nuclear activities under the supervision of the international legitimacy, which supervises the activities of the Arabs regarding this, particularly Iraq.

The paper holds Britain responsible for orchestrating a carefully studied terrorist campaign involving a move

from the espionage stage to that of interference in Iraq's more sensitive and delicate defense affairs. It adds Britain has chosen to be the spearhead for the traditional party that always has worked against Arab advancement and progress.

AL-JUMHURIYAH tackles the U.S. role in the unjust anti-Iraq campaign and says: Had it really been serious in working against the proliferation of nuclear weapons, the United States would not have accepted involvement in the exposed British-Zionist terrorist scheme. It moreover would have accepted as true the reports of the International [Atomic] Energy Authority, which monitors all nuclear activity in Iraq, which is proceeding toward sound industrial development.

AL-JUMHURIYAH accuses Britain, the United States, and other international parties of overlooking the disgraceful state of affairs regarding the inequitable treatment accorded to the Arabs, compared with that accorded the Zionist entity.

IAEA Inspectors Visit Nuclear Installations

JN1104124890 Baghdad INA in Arabic 1140 GMT 11 Apr 90

[Text] Baghdad, 11 Apr (INA)—The national inspector of the Iraqi nuclear installations has said two inspectors of the International Atomic Energy Authority [IAEA] are currently visiting the Iraqi nuclear installations, which all are placed under IAEA control. The visit will last from 7 to 12 April.

The national inspector of the Iraqi nuclear installations told INA the two inspectors are conducting a full periodic inspection of all the Iraqi nuclear installations. They visited the Tammuz reactor, which was destroyed by an Israeli raid in 1981, and which Western circles claim Iraq has secretly rebuilt and is operating again. The IAEA will announce the results of its inspection next week.

Source Denies Alleged 'Heavy Weapons' Transfer

JN1104204090 Baghdad INA in Arabic 2010 GMT 11 Apr 90

[Text] Baghdad, 11 Apr 9 (INA)—A responsible Iraqi source commented on a report carried by London BBC television during its newscast this evening. The report says customs officers at the port of Teeside in north-eastern England have seized a quantity of heavy weapons aboard a ship whose destination was Iraq. The station claimed the uncovered heavy weapons included 40-ft-long cannons.

The Iraqi source denied this allegation and described it as baseless and sheer lies that are part of the frenzied campaign by British and Zionist circles against Iraq.

In a statement to INA tonight, the source explained the ship is carrying steel pipes for a petrochemical project in Iraq.

The responsible source challenged anyone to prove these pipes are not for industrial purposes.

ISRAEL

Agency To Launch 'Huge' Satellite in Two Years

TA1204164390 Jerusalem Domestic Service in Hebrew 1600 GMT 12 Apr 90

[Text] The Israel Space Agency in two years will launch a huge scientific satellite containing three of the most sophisticated telescopes in the world, Professor 'Aqiva Bin-Nun, the agency's coordinator said.

The telescopes will be capable of uncovering millions of unknown stars and thousands of galaxies. U.S. institutions are showing great interest in the Israeli scientific satellite and are prepared to help with funds, sophisticated equipment, and ground stations to collect the data from space.

Prof. Bin-Nun said the Israel Space Agency has commercial agreements with large companies over the Amos communications satellite, which will be launched in the near future. Amos will be launched to an altitude of 36,000 km via a European Space Agency rocket.

LIBYA

Al-Qadhdhafi Calls for Arab Nuclear ICBM's

LD2004141990 Tripoli Television Service in Arabic 2106 GMT 19 Apr 90

[Speech by Colonel Mu'ammar al-Qadhdhafi at a meeting with students of the Higher Institute for Applied Social Studies at the Great al-Fatih University in Tripoli on 18 April—recorded]

[Excerpts] [passage omitted] Think of a method of deterrence for the whole Arab world; it should deter imperialism, Zionism, in Europe or anywhere. This homeland aspires in the coming twenty years to be feared; not like before: France, taking Tunisia and Algeria; England, taking Egypt and the Sudan. Between you there is a piece of land they called Libya and you gave it to the Italians [as heard]. This they gave to the French. This should not be repeated.

When we have a deterrent force, they will no longer think about dividing us. This is not a myth or a fable; this is the truth. Did not the Americans almost hit you yesterday when you were asleep in your homes? If they know that you have a deterrent force capable of hitting the United States, they would not be able to hit you. If we had possessed a deterrent—missiles that could reach New York—we would have hit it at the same moment. Consequently, we should build this force so that they and others will no longer think about an attack. Whether regarding Libya or the Arab homeland, in the coming twenty years this revolution should achieve a unified Arab nation. This revolution should achieve the unity of

the Arab nation. This should become one homeland, the whole of it, possessing missiles and even nuclear bombs. Regarding reciprocal treatment, the world has a nuclear bomb, we should have a nuclear bomb.

When I asked the leader of China how did China manufacture the hydrogen bomb, he told me: Listen, we are a poor part of the Third World. I told him I visited the Great Wall of China, but on the way I saw the Chinese carrying big stones on donkeys. What is this? They said there is a river and when its flood time comes, it is blocked from this side by stones and mud and then we remove the stones so that the river can flow. They carry the stones on donkeys. When I returned I told Li Peng: China has a hydrogen bomb and I saw you carrying stones on donkeys. He said: China is a poor country and still employs donkeys, horses, and mules, and hands. But I collected a pound from every Chinese until I had a billion with which I manufactured the hydrogen bomb. I said every Chinese pays a pound. I said why? He told me I show the other big powers which have nuclear bombs

that if they play with the nuclear bomb, they will not be able to play with China. For this purpose, to deter, to stop them from saying they will not say the size of the population of China is big and its territory is big, and we shall occupy it one day, use nuclear bombs against it and take it. We tell them even China has a bomb. If bombs are used, even China can use them. If nuclear bombs are not used, well, this is what we want.

This is our logic, also. When the world is playing around with rockets and bombs, we must be capable of playing the game. These are our objectives. [passage omitted] We want to create a deterrent force such as has been created by the world's tyrants. They must realize the people of this homeland must be able to live in security; that is all, to be able to live in security, to plough, plant, dance, and sing in our homeland in security as a result of having a deterrent. This is what we must achieve in the next 20 years—by achieving the unity of the Arab nation and creating a strategic force. [passage omitted]

EUROPEAN AFFAIRS

European Parliament Urges Embargo Against Iraq

AU0504193490 Hamburg DPA in German 1510 GMT
5 Apr 90

[Text] Strasbourg (DPA)—The European Parliament in Strasbourg has called for the prohibition of war materials exports to Iraq. The 12 EC states should try every means possible to prevent Iraq from procuring nuclear weapons, a resolution adopted on Thursday [5 April] says.

Iraq violated the Nonproliferation Treaty it had signed when it attempted to import components for nuclear weapons. That attempt was disclosed in London last week. In the opinion of the Parliament, the UN Security Council should also consider appropriate countermeasures by the international community. In addition, the parliamentarians condemned the threat by Iraqi head of state Saddam Husayn to use chemical weapons against Israel.

CANADA

Darlington Reactor Forced To Gear Down by Crack in Shaft

51200013A Toronto THE TORONTO STAR in English
16 Mar 90 p A3

[Article by Daniel Girard: "Darlington Reactor Forced To Gear Down by Crack in Shaft"]

[Excerpts] The Darlington nuclear plant has cut back a reactor to 1 percent power after a potentially deadly accident in a generator was averted.

Ontario Hydro has shut down the Unit 2 generator and the nuclear reactor, which was not involved in the incident, has been cut back to about 1 percent capacity from 50 percent.

Hydro was licensed on Feb. 22 to boost the Unit 2 reactor up to 100 percent capacity.

The utility had been denied a licence in December to boost power in the reactor, due mainly to safety concerns by the Atomic Energy Control Board.

Darlington technicians first noticed an unexpected increase in vibrations in the generator last Friday after the reactor, the first in operation at the \$12.5 billion plant, has been boosted to half power, project manager John McCredie said in an interview yesterday.

The unit was immediately turned off manually as a safety measure and by Tuesday night the problem had been diagnosed as a crack in the 200-tonne generator shaft, McCredie confirmed.

An anonymous caller told The Star Wednesday night there had been a problem with a cracked shaft in a

generator on the non-nuclear side of the plant and expressed his concern about what could have happened.

"It could have potentially caused one hell of an accident.

"At 1,800 r.p.m. (revolutions per minute), the generator would have demolished itself and we would have been picking up pieces of metal off (Highway) 401. We are very, very lucky," said the man, who refused to give his name.

"Ask Hydro if that's true," he urged a reporter.

The accident had "the potential for killing people," said the board's director-general, Zygmund Domaratzki, from his Ottawa office.

A complete break in the shaft could have sent pieces of it flying into the generator and hydrogen, used to cool the fast-spinning steel, could have caught fire, he said.

The hollow-steel shaft, which runs horizontally through the generator, has a vertical crack, said Sue Stickley, a Hydro spokesman at Darlington.

The 935-megawatt generator is the last step in the process producing electricity. It is on the non-nuclear side of the plant, away from the self-contained reactor. [passage omitted.]

Technicians from Hydro and the shaft's Swiss manufacturer will examine the rotor on Monday to establish the cause of the crack and determine whether it's an isolated incident or a flaw that may arise in the plant's other three generators.

Hydro hopes to install the Unit 4 rotor into the Unit 2 generator and be back in operation within three weeks, said Stickley.

FEDERAL REPUBLIC OF GERMANY

Reprocessing Contracts Undergo Scrutiny in Bonn

90WP0046A Duesseldorf HANDELSBLATT in German
2-3 Feb 90 p 19

[Article by Heinz Juergen Schuermann: "State Secretary Martin Gruener Says Direct Final Deposit Is Long-Term Option"—first paragraph is HANDELSBLATT introduction]

[Text] Article 9a of the Atomic Energy Law prescribes reprocessing as a priority waste removal method. After the abandonment of Wackersdorf, the federal government refrained from a nationwide solution. The Federal Environmental Ministry now has four model contracts for reprocessing in France and Great Britain available for examination.

State Secretary Martin Gruener, the parliamentary state secretary attached to the federal minister of environment, nature protection, and reactor safety, in a press conference emphasized that the drafts submitted on 29

January would now be examined briskly. He was optimistic in noting that the model contracts for reprocessing of spent fuel elements from German nuclear power plants would appear to be approvable; these model contracts had been coordinated with COGEMA and BNFL.

The federal government he indicated, would back the planned private-law agreements in terms of international law. This parallel effort could be accompanied by correspondence with Paris and London, coordinated by the Federal Foreign Ministry.

On the basis of the four model contracts, the energy supply enterprises would then conclude the individual contracts as a contribution to the waste removal programs for their nuclear power plants. Said Gruener: "Reprocessing contracts will be concluded for the period up to and including the year 2005, with unilaterally existing options until 2015." The German nuclear power plant operators assumed for technological reasons that direct final storage was not available as a waste removal method for the period of time for which a regulatory settlement is to be worked out at this moment.

But it is noted that there is agreement between the federal government and the enterprises concerned, to the effect that research and development work on direct final storage of spent fuel elements from light-water reactors would have to be pushed emphatically. The German nuclear power plant operators reportedly emphasized that they want to make the extent to which COGEMA or BNFL are to go into action in the context of the subsequent contracts "depend on the economic conditions in the final analysis."

Long-Term Requirements Covered

The quantitative structure agreed upon in the model contracts, however, is considered to be compatible with the anticipated requirements. The prices of the reprocessing services would be negotiated in the course of bilateral agreements; that was none of Bonn's business. The federal government is to examine whether a commensurate waste disposal preventive-care program could be worked out. The critical testing criterion is said to be the evidence that the term of six years is complied with, and that a long-range concept on the lifetime of the nuclear power plants be started. If any of the agreements should be cancelled at any time, then it would be necessary to keep evidence as to an adequate alternative.

In case of facility changes in France and Great Britain resulting from the safety-engineering follow-up improvement requirements of the government agencies, certain keys for cost distribution were agreed upon in the model contracts. In the stipulated commissions, the federal government has certain possibilities for speaking out when it comes to the future design of the French and British reprocessing plants. In any case, the basic EC standards would be respected in both countries, according to Gruener. As has been agreed upon so far, the waste would have to be taken back by the West

German enterprises in transportable and storable form. According to information supplied by the Federal Environmental Ministry, such waste will be generated from old contracts for the first time starting in 1993. The new contracts are now also expressly designed to regulate the component of final-storage-capable processing.

Separated from the reprocessing contracts, the domestic energy supply enterprises are also negotiating company law partnerships in the two reprocessing plants in France and Great Britain. The result is as yet not known.

The federal government continues to desire that national know-how not be lost in reprocessing technology. This technology would have to be further developed, Gruener commented. The improvement of the reprocessing methods would also be in the interest of the enterprises as such. The state secretary as yet did not want to make any statements concerning the form and the financing by means of which the reprocessing plant in Karlsruhe is to be further operated.

However, during the winter conference of the German Atomic Forum, Walter Hohlefeldt, a department head in the Environmental Ministry in Bonn, did not conceal his disappointment over the fact that individual expectations of the federal government have not yet been fulfilled. Efforts by industry concerning the promised receipt of technology for future reprocessing at home, which cannot be ruled out, appeared to be more than just hesitant. European cooperation in the field of fuel element production is likewise not progressing to the desired degree, it was noted.

Regardless of what one's opinion is regarding the further use of nuclear energy or the question of direct final storage or reprocessing, we do face the need of pushing the erection and operation of a federal final disposal facility with high priority. Intermediate storage could only be "an intermediate step" on the way toward the final elimination of radioactive waste in deep geological formations, Hohlefeldt noted.

Even if the Gorleben site should prove suitable, the direct final storage project could, at the earliest, go into operation around 2008 or 2009, Gruener stated. Now the thing is, first of all, to work out a compromise through the approval of Konrad. Looking at the Konrad final storage project (storage of slightly and medium radioactive waste), there are no arguments for denial that can be cited, quite in contrast to the Gorleben final storage facility.

FINLAND

Soviets Reveal Spent Reactor Fuel Destination

90WP0052A Helsinki HELSINGIN SANOMAT in Finnish 2 Feb 90 p 5

[Article: "Imatran Voima Finally Told Destination of Spent Nuclear Fuel: Uranium Treated in Chelyabinsk, East of Ural Mountains"]

[Text] Loviisa—The Soviet Union's nuclear power authorities have told Imatran Voima (IVO) where the Loviisa power plant's spent fuel goes. It is shipped from Finland to the Chelyabinsk nuclear waste treatment plant in the southern Urals [as published].

Uranium suitable for fuel is stored at the plant. The highly radioactive leftover nuclear waste is cooled in aboveground warehouses for 20-30 years and finally buried in bedrock.

Up until now, the Soviet authorities have kept mum on the spent fuel's destination. The fuel is transported in Soviet railway equipment, and the Finns' responsibility ends at Vainikkala. Because the treatment of highly radioactive nuclear waste is left to Soviet care, no one has pressed persistently for the treatment plant's location.

The spent nuclear fuel from all reactors of the VVER-440 (or Loviisa) type that operate in the Soviet Union and abroad is transported to the Chelyabinsk treatment plant located east of the Ural Mountains.

Altogether, 33 Loviisa-type plants have been built in Eastern Europe and the Soviet Union, and 11 more are under construction. Seventeen 1,000-megawatt nuclear power plants are also in use in the Soviet Union and East European countries.

A radiochemical plant, which in its first few years produced plutonium for military use, was constructed in the Chelyabinsk area in 1949. Later the plant was converted to treat fuel used by submarines and ice-breakers. The plant also began to treat spent fuel from nuclear power plants in the 1970's. The Chelyabinsk plant now employs about 10,000 persons.

Spent fuel has been transported from the Loviisa power plant to Chelyabinsk altogether nine times since 1981. IVO has thus far returned to the Soviet Union 1,524 spent-fuel bundles, which have contained 176 tons of uranium all told.

After being used, uranium is cooled at the Loviisa power plant for about five years before being returned. Two shipments were made last year.

The spent fuel from 1,000-megawatt nuclear power plants larger than the Loviisa facility is shipped from Siberia to Krasnoyarsk. A large reprocessing plant, which is supposed to begin operations in 1997, is now being constructed in the area.

IVO buys the uranium fuel needed by the Loviisa power plant from the Elektrostal fuel factory near Moscow. Its doors remained closed to Finns up until last year. Representatives of both Imatran Voima and the Radiation Safety Center would like to have acquainted themselves with production of the fuel, but their requests were turned down.

The Radiation Safety Center would like to have learned how the fuel is produced because security factors are tied to its production. Two Finnish groups visited the fuel factory last year.

Animals Show No Nuclear Radiation Effects

90WP0052B Helsinki HELSINGIN SANOMAT in Finnish 22 Feb 90 p 5

[Article: "Normal Amounts of Vitamin A in Livers of East Finnish Animals: Kuopio Researcher Considers National Health Board's Restrictions on Consumption Excessive"; editor's note: article refers to effects of Chernobyl accident]

[Text] Kuopio—The liver of East Finnish swine and cattle is still good food, according to research conducted at Kuopio University's Institute for Biochemistry and Biotechnology. Nor do studies in Kuopio indicate abnormal amounts of vitamin A in people. There is nothing to prevent people from eating liver the way they did before.

The Kuopio studies show that East Finnish producers do not use megadoses of vitamins in feeding their animals. According to the researchers, however, it is possible, for example, that some farmers in Uusimaa do.

Basing its case on high levels of vitamin A in liver studied during doctoral research in Helsinki, the National Health Board has recommended that children and pregnant women in particular avoid eating liver. Liver has subsequently been eliminated entirely from school menus, and baby food prepared from liver has been taken off the market.

Professor Markku T. Parviainen has studied the vitamin A level in samples of swine and cattle liver chosen randomly in Kuopio. He considers the recommendation overkill. A person who consumes vitamin preparations would have to take 10 times the normal dosage or eat large weekly servings of liver in order to harm his or her health.

Authorities Believe Campaign Has Been Effective

The National Health Board believes that the Kuopio results reflect an improved situation throughout the country. Similar results were obtained in surveys conducted in January by the State Veterinary Medicine Institute. The results of measurements by surveillance authorities in different parts of the country also point to lower amounts of vitamins than thought.

Large amounts of vitamin A were found in a survey conducted in late autumn. "It appears that the vitamin content is dropping rapidly," estimated Pekka Pakkala, National Health Board senior inspector. "At best, the dietary restrictions may be lifted as early as March or April."

The National Health Board originally thought that the restrictions would remain in effect until at least the summer.

Prof. Parviainen does not believe that the difference in research results is explained by a rapid improvement of the situation. In his view, the difference in time when the samples were taken has been so short that it has not been able to affect the results, even if the animals' food was changed.

The National Health Board is now awaiting the results of measurements of the vitamin content of prepackaged foods prepared from liver. According to senior inspector Pakkala, convenience foods are used nationwide and are therefore important for surveys.

The Commerce and Industry Board will clarify how much vitamin A is in convenience foods. A task force appointed by the National Health Board will gather the results of surveys conducted by the surveillance authorities. The plan is to publish the results in March.

Quick-frozen liver may be used in prepackaged and ready-to-eat foods, so that the amount of vitamin A in them does not necessarily decrease as rapidly as in cattle livers.

After the vitamin uproar, the Ministry of Agriculture and Forestry gave veterinarians and fodder producers recommendations for reducing vitamin A content and avoiding the use of vitamin A.

Farmers have not been informed of the dangers of megadoses. Earlier, slaughterhouse consultants have encouraged pig farmers to increase vitamin doses in order to prevent deficiency diseases.

Vitamin metabolism has been studied for about 15 years at Kuopio University's Institute for Biochemistry and Biotechnology. The vitamin A content of swine and cattle liver samples taken from the Lihapolari Slaughterhouse was recently examined.

Amount of Vitamin at Average Level

Parviainen says the research was conducted on account of the debate that was kindled in January because previous studies done on Kuopio residents did not in any way support the results published in Helsinki.

According to the Kuopio results, the level of vitamin A in cattle was completely normal, comparable to the previously known level of 11 milligrams per 100 grams. The vitamin A level in swine liver—an average 31 milligrams of vitamin per 100 grams of liver—is substantially lower than that published in southern Finland. The National Health Board's startling figures are three times that high.

The vitamin A content of Finnish animal liver is about the same as in several other countries. Only with qualifications can one speak of extremely high contents.

The swine liver samples came from 30 different producers. Ten samples of cattle liver were studied. Parviainen suspects that different methods employed by the Helsinki and Kuopio researchers may have an effect on the results. He also considers the number of samples studied small.

In the opinion of senior inspector Pakkala, the differences in result due to dissimilar research methods are not significant.

There is nothing to prevent people from eating liver the way they did before, believes Prof. Parviainen. In blood counts done on people in the late 1980's, there is no indication of vitamin A overdoses.

Vitamin A deficiency causes changes, for example, in the mucous membranes of the lungs and intestines, and the retina of the eye. Vitamin A is therefore essential for man. On the other hand, an overdose of vitamin A may cause fetal deformities in pregnant women.

Professor Pekka Maenpaa, who launched the vitamin research in Kuopio, reassures expectant mothers. For instance, multivitamin tablets contain 5,000 units of vitamin A. The consumption limit for pregnant women has been set at 25,000 units, so only a fivefold increase in dosage could have consequences.

There is no reason to eat liver every day, believe the researchers, but one meal of liver a week does no harm during pregnancy. According to the researchers, there is no special reason to limit the amount of liver children eat.

In Parviainen's opinion, Finns get enough vitamin A in a well-rounded diet and do not need vitamin pills, except perhaps in late winter. At that time the vitamin level decreases because plants lose vitamin A when they are stored, for example. So a carrot in spring has only a small amount of the vitamins it had in autumn.

FRANCE

Nuclear Industry Assesses Safety Problems

90WP0061A Hamburg DIE ZEIT in German
9 Mar 90 p 30

[Article by Rene Brunner: "A Failure in the Nuclear Community"]

[Text] During a routine inspection of the French Gravelines I (North) nuclear power plant last August a technician discovered a hair-raising situation. The three safety valves in the primary loop, which are supposed to prevent any increase in pressure in the event of an accident, were not working. The reason: Following a test, workers had forgotten to install the valves according to correct procedures. The reactor ran for more than a year without high pressure safeguards. In the event of an accident the consequences would have been devastating.

In the reactor building of Dampierre I, it was two plugs in the water separation system that had been forgotten. Until the routine check of the safety system, which is indispensable in the event of a core meltdown to prevent hydrogen explosions, and which prevented the worst conceivable accident at the Three Mile Island disaster, the reactor continued to run for more than six months, in spite of the paralyzed safety system.

Serious breakdowns, such as those in Gravelines and Dampierre seem to be the order of the day in France. The safety board Service Centrale de Surete des Installations Nucleaires (SCSIN) reported 362 incidents in the past year alone in the 54 operating nuclear power plants: Eighty-four of these incidents were judged to be hazardous to safety. "Human error—we have to live with it, and it cannot be avoided," is the way Lucien Berton, director of thermal production at the French electricity company EDF, tries to publicly play down the significance of these serious safety lapses. But the boasted trust of French proponents of nuclear energy in the safety of their own nuclear power plants has been shaken to its foundations: What use are all the safety measures, if workers can confuse valves that are crucial to survival, without anyone noticing?

Serious Breakdowns

For the first time since the introduction of a danger scale which goes all the way to alarm level six, the incident at Gravelines triggered level three, which had been reached once before during a serious breakdown in Bugey in 1984. "Two such incidents in five years, in an average of 40 units, is a frequency of one percent per unit per year. That is very little, but such 'near accidents' every two years are not the best way of improving the image of safety in French nuclear power plants," is the warning from Pierre Tanguy, inspector general of the EDF for nuclear power plant safety, in an internal study: "Given the current level of safety at the EDF nuclear power plants, the possibility of a more serious incident in the years ahead is several percent."

Fresh Views

Such views are totally new. For years, according to the official interpretation of the French nuclear plant operators, the risk of an accident was negligibly small. Now the "quantite negligeeable" is suddenly a probability, comprehensible and troublingly high even for a layperson. The breeder reactor Phenix in Marcoule, for example, triggered three rapid shutdowns before those responsible decided to remove it from the network to investigate the unexplained problem. The reactor had accumulated a noble gas bubble of between 30 and 50 liters in the fringe area of the core. In the fission zone of the core this bubble could have led to an accident comparable to Chernobyl.

Lucien Berton admits that the incidents "point up organizational deficiencies and affect all repair work in the nuclear power plants." Michel Laverie, the head of the

safety authority, voices the criticism that he had to exert strong pressure for the operators to guarantee a satisfactory level of safety. In plain words: The honeymoon between the safety authorities and the nuclear lobby in France is over. "The safety authorities issued a number of opinions in 1989 which unmistakably established their independence from the EDF," EDF safety inspector Pierre Tanguy reports, and he warns his own people: "This development will lead to new restrictions, and it is very probable that additional conditions will follow in the next few years that we will have to comply with, if we want to continue our nuclear program under acceptable conditions."

Controversies between the safety authority and the nuclear power lobby were unknown in a country that steadfastly denied for two weeks during the Chernobyl disaster that higher levels of radiation had crossed the Rhine. Criticism of the lax safety measures in French nuclear power plants came only from the Greens and a few left wingers, but never from state inspectors or the EDF itself. Tanguy is breaking this taboo for the first time with his frank warning. According to a report in the weekly newspaper CANARD ENCHAINE Tanguy's study met with violent opposition within the EDF. Panicked, his internal opponents not only demanded a milder version. They are also accusing him of having simply miscalculated in estimating the probability of a serious incident. Tanguy denies this emphatically.

The uproar about the study is understandable. In his report Tanguy credits the French nuclear power plants with a level of safety conforming to international standards. The report states that the number of "significant incidents" had declined in past years. It states further that the number of "urgent instant shutdowns" had also decreased.

But the EDF official nevertheless leaves no doubt that there are still substantial safety problems. "Some vital components are aging more rapidly than predicted," reads his open criticism, and he points to the consequences of this evidence of old age. Because the French nuclear power plants were built in successive batches, the current signs of deterioration apply not just to individual reactors, but to the entire stock at once.

According to the study, the most serious design errors in the steam generators, which are eminently important as links between the primary and secondary loops and are causing headaches at all the French pressurized water reactors. Checks at some 1,300-mw reactors showed that more than 100 tubes per steam generator had distortions that resulted in cracks or could have led to cracks. From a technical safety standpoint the cracks conceal the danger of a pipe fracture, which could result in a core meltdown.

How seriously the EDF is taking this problem is shown by the hastily reached decision to replace the steam generators in 24 reactors at a cost of DM2.7 billion. This

is an enormous investment for the state electricity producer, which, following a catastrophic business year in which 20 of the 54 reactors had to be temporarily shut down during the hot summer, has announced a loss of DM1.2 billion and a debt of DM78 billion.

The beneficiary of this rehabilitation program is the reactor construction company Framatome, which is fighting for survival since the French nuclear program has been drastically slowed down. For three years Framatome's order book has been without a contract from the EDF, which has slowed the pace of construction to one unit every four years. French nuclear-generated electricity is not only expensive, but is also available in excess and is being sold off at bargain prices, as in the case of the deal with the new Pechiney aluminum factory in Dunkirk.

A study from the policy research unit at the University of Sussex calculates the worldwide need for nuclear power plants until the year 2000 at a maximum of 15 units, five of them in Great Britain, whose government has imposed a moratorium. With the replacement of the unusable steam generators EDF is taking account, at least outwardly, of the growing awareness of the dangers of the nuclear industry in France. At the same time, the rearmament program is a crucial financial shot in the arm for the reactor builder. It allows Framatome to continue to be involved in the nuclear business. "We will not abandon reactor construction and will maintain our expertise in this area," Framatome head Jean-Claude Leny stresses.

Embargo Circumvented

The sale of a nuclear power plant to Pakistan seems like a life belt for the crisis-ridden French nuclear industry. The fact that France, as a result of delivery to a country that is working on the Islamic bomb or already has it, is breaking the non-proliferation pact of 1968 and is circumventing the embargo of 1978, by which Jimmy Carter wanted to prevent Third World countries gaining possession of the atom bomb, caused hardly any reaction in France. It was quite different in the United States. "The principle was that the advanced countries do not provide technology for any purpose to any country that does not open all its installations to international inspection. Now France is the first Western country that is ignoring the requirement of complete supervision," is how the WASHINGTON POST criticizes the deal. The Pakistanis continue to refuse to open their existing plants to inspection by the West.

In spite of the government's opportunistic decision and the absence of a storm of outrage against the deal with a country that is on the verge of war in Kashmir, the sensitization of the French populace for nuclear questions is increasing noticeably—and is showing its first results. After bitter resistance from the affected nearby inhabitants, Prime Minister Michel Rocard recently had to halt the test drillings for the storage of radioactive waste in four French communities for at least one year.

Even if nuclear power still enjoys the image of "clean" energy among many of the French—in the case of the comparatively harmless waste, they are becoming aware that they are living with time bombs.

Military Sales to India Seen Endangered

90ES0573C Paris *LES ECHOS* in French
23 Feb 90 p 2

[Article by Alexandra Schwartzbrod: "France May Lose Indian Arms Market After Sale of Nuclear Power Plant to Pakistan"]

[Text] In providing Pakistan a nuclear power plant, Francois Mitterrand took the risk that French firms might in the future be shut out of the Indian market, especially the arms market. And it is a market French firms have spared no efforts to cultivate.

French and Soviet builders for some time now have been breathlessly waiting for India to start on what is expected to be a major renovation of its fighter aircraft fleet. The Indian Air Force, essentially consisting of two squadrons of Mirage-2000's and two squadrons of Soviet MiG-29's, has for some time now been planning to increase its strength.

India, as an ardent practitioner of "dual-source" provisioning, is visibly wavering between the MiG-29, which the Soviets are offering to let it build under license, and the Mirage-2000, whose price (about \$20 million) is judged too steep. Paris is also following two other aeronautical markets with great interest: trainer aircraft, a field in which the Franco-German Alpha-Jet is still a contender, and the light fighter aircraft (LCA) which India wants to build on its own, with possible help from France. Dassault is particularly keen on this program, since it was involved in the initial design work.

Aircraft Carrier Under Study

In the naval sector, France still hopes to get the contract to design an aircraft carrier (30-35,000 tons) which India hopes to build by the year 2000. It is an ambitious project, one that may never come to fruition for lack of funds, but in late 1988 the Directorate of Naval Construction in the French Ministry of Defense obtained an initial study contract; since then there have been several high-level contacts between the two general staffs.

Finally, people are still talking about the infamous 155-mm gun contract which GIAT [Ground Weapons Industrial Group] in 1986 lost to the Swedish firm Bofors, the latter having since been accused of bribing the Indian authorities. While passing through India in January, Michel Rocard acknowledged that India was once again interested in artillery guns "Made in France" and confirmed that the affair had been discussed in his talks with V.P. Singh, the new head of government.

But today the tone has changed, as seen for example in the refusal of the Indian authorities to involve Airbus

Industrie in the investigation of the Bangalore air disaster that took 90 lives. The French ambassador in Delhi was finally forced to make a formal request for the results of the investigation.

SPAIN

CSN Head Congressional Appearance

Plant Closing Urged

90WP0057A Madrid EL INDEPENDIENTE in Spanish
22 Feb 90 p 25

[Article by Angel Munoz: "As Clear as Clear Can Be"]

[Text] The chairman of the Nuclear Safety Council (CSN), Donato Fuejo, has "dotted all the i's" concerning the controversial closing of Vandellós I. Even before drafting its preliminary report on Vandellós I, the CSN said it would not decide to close the plant, inasmuch as this would be a decision to be made by the government or, in this instance, by Congress due to the political, social, and legal factors involved.

Fuejo asked Congress for its support in "reminding the Executive Branch or specific government institutions to assume their proper responsibilities." The CSN chairman stated that "the Executive Branch is sometimes tempted not to carry out existing regulations." The CSN is therefore calling upon the only institution with authority over it for support in its job of increasing the degree of safety of nuclear and radioactive facilities.

Fuejo admitted the inadequacies of the CSN despite improvements made and the organization's lack of power to stand up to "pro-nuclear" forces in the administration and electric power companies themselves.

Donato Fuejo's speech reveals the grave situation of the Spanish nuclear sector after the scandal created by the accident at Vandellós I. It was the clearest speech ever delivered on Carrera de San Jerónimo concerning the safety of atomic power plants. It is now up to the government to act.

The chairman of the Nuclear Safety Council (CSN) called upon Congress yesterday to order the closure of Vandellós I because of the serious accident that occurred on 19 October of last year, an accident that came close to being a second Chernobyl in Europe. Fuejo said that the "Council has neither the capacity nor the power to decide, except in cases of imminent risk or danger when it can shut down a plant, whether a nuclear power plant should be opened, operated, or shut down and dismantled." Fuejo told deputies on the Industrial Committee that it is Congress or the government that must decide whether Vandellós I is to reopen or remain closed indefinitely.

Fuejo thus invalidated the line heretofore taken by various parties and institutions awaiting an alleged decision by the CSN on the future of Vandellós I in its final

report. In fact, a majority of deputies voted against the permanent closure proposed by the United Left (IU), alleging they had to wait for the CSN's final report. However, in his appearance before the congressional Industrial Committee yesterday, Fuejo repeated that the preliminary report made public in December was already a clear and meticulous document that could be used as a basis for a clear opinion on whether or not to shut down the atomic power plant permanently.

The CDS [Democratic and Social Center] will ask the minister of industry to appear before Congress next week to explain whether it is actually the Executive or Legislative Branch that must make the final decision on Vandellós I once the data provided by the CSN has been analyzed.

Following Fuejo's speech, the minister of industry reiterated to the EFE Press Association that his department would not rule on the permanent closing of the Vandellós I nuclear power plant until it received the Safety Council's final report.

During a large portion of his speech, the chairman of the CSN repeatedly warned deputies of the difficulties involved in reopening Vandellós I, not only because of major modifications that must be made, but other factors relating to the fuel supply and recycling and the future of the French nuclear power plant that served as a model and that will be closed in four years. Vandellós I uses French graphite-gas technology and with the closing of plants of this type already starting in that neighboring country, Vandellós I will have serious problems if it is reopened. Fuejo therefore warned of technological insufficiencies the plant will face if a decision is made to modify it for reopening and of the need to find alternatives to the current fuel supply, inasmuch as fuel meeting the specific needs of Vandellós I is produced and reprocessed only in France.

Design Flaws

Fuejo warned of serious difficulties involved in reopening the plant and of serious flaws in the graphite-gas design, going so far as to state that "the accident at Vandellós I would have been more serious if it had occurred during the early years of operation, inasmuch as the technicians had less experience and would not have been able to control the cooling of the plant manually, as was the case at Tarragona on 19 October. Fuejo said the accident could "in no way be related to the aging of the plant," but rather, "to lack of foresight and flaws in the original design."

The chairman of the CSN said that in France, reforms were made in all plants of this type after several accidents had occurred, but that such modifications had not been made in Spain because, until last October, the plants had all operated properly.

Fuejo said that he was speaking to the deputies with complete sincerity and that IU Deputy Manuel Garcia

Fonseca was right in saying he was puzzled that Vandellos had not been closed before the October accident because of repeated safety violations.

Antinuclear 'Euphoria'

90WP0057B Madrid *EL INDEPENDIENTE* in Spanish
23 Feb 90 p 25

[Article by Angel Munoz]

[Text] The speech before Congress by Donato Fuejo, chairman of the Nuclear Safety Council (CSN), generated euphoria in political and social sectors demanding the permanent closing of the Vandellos I atomic power plant. Several political parties have announced bills they plan to introduce in Congress and the region where the plant is located, and ecology group headquarters deem the CSN chairman courageous in recognizing the extremely difficult situation in which the complex nuclear sector finds itself.

Manuel Garcia Fonseca, deputy for the United Left-Initiative for Catalonia, announced that after hearing Fuejo's speech and his request for congressional support in beefing up the CSN's role in the area of nuclear safety, his congressional group would present three bills on Carrera de San Jeronimo. The IU [United Left] intends to ask that the next reorganization of the CSN include one or two members not connected with companies deriving their profits from the nuclear sector. Fonseca said that the full complement of the CSN, made up of five persons, should include a "critic" of some branch of energy. Only the chairman of the Council has not previously worked for the companies it must now oversee. The clearest case of a pronuclear Council member for the IU is Luis Echavarri, who previously served as director of construction for several nuclear power plants.

The United Left will present a proposal to reform the Safety Council Law in order to give that organization, answerable only to Parliament, greater powers and means in order to oversee all radioactive facilities more effectively.

Fuejo said the Council has scant means despite improvements made and that in the early years of the past decade, the CSN had at the same time to supervise the closing of several nuclear power plants, "requiring a major effort."

Next week the Democratic and Social Center (CDS), which voted in Congress to close Vandellos I permanently, will question the minister of industry before the entire Congress in order to ascertain whether it is Parliament or the government that must decide the future of the plant after analyzing data supplied by the CSN.

"Miracle We Are Alive"

For the mayor of L'Ametlla de Mar, located near the atomic complex, Fuejo's words to Congress demonstrate once again that "it is a miracle we are alive." "Vandellos obviously suffers from an incurable disease, which the

chairman of the CSN has fortunately confirmed," the mayor added, noting further that certain persons "would have much more to say if they did not occupy the posts they do."

Other political parties are reconsidering their positions on the future of the power plant now that the chairman of the CSN has made it clear that it is not up to the Council to decide whether or not to close Vandellos I.

Parties represented by deputies on Carrera de San Jeronimo took note of Fuejo's hint. In his speech, the latter indicated that the plant should be closed and that "the Executive Branch and other organizations are sometimes tempted not to abide by regulations."

Carlos Davila, spokesman for the PSOE [Spanish Socialist Workers Party] on the Committee, has repeatedly expressed PSOE support for Fuejo, from which one can deduce that some sectors of the party seem willing to take on the burden of the political cost involved in reopening Vandellos I.

TURKEY

Ministry Sees No Hostile Iraqi Missile Intent

TA0504101290 Ankara *ANATOLIA* in English
0855 GMT 5 Apr 90

[Text] Ankara (A.A.)—The intention of how to use missiles is an important factor in a potential threat situation, the Foreign Ministry said on Wednesday following recent reports that Iraq has long-range missiles capable of carrying chemical warheads. Iraq has said it has chemical missiles capable of hitting Israel, which could be used in the event of an Israeli threat. A Turkish newspaper said on Wednesday that the missiles were a threat against Turkey as well.

Foreign Ministry spokesman Ferhat Ataman told A.A. that Turkey had friendly relations with Iraq. "On the missile issue, there are two elements in a missile threat. One is the actual existence of the weapon, the other is the intent of using it. In this respect, our relations with Iraq are good and friendly," he said.

UNITED KINGDOM

Huge Cannon Components Seized

En Route to Iraq

LD1204062690 London *PRESS ASSOCIATION*
in English 0557 GMT 12 Apr 90

[Report by Charles Miller, *PRESS ASSOCIATION* defense correspondent]

[Excerpts] Arms experts were today examining what customs officers believe is a monster 40-metre gun,

which was destined for Iraq and is capable of firing nuclear and chemical shells hundreds of miles. It was carefully packed in sections in eight separate crates. Customs understand these parts fit together to produce what could be the world's biggest gun. However, the company believed to have manufactured the sections, Sheffield Forgemasters, has stressed that if the parts are from its factory, they do not form a gun but a pipe for use in the petrochemical industry.

Customs officers detained the crates at Middlesbrough Docks, Teesside, yesterday and are confident the parts will be confirmed as forming a massive 140-ton gun barrel. If this is so, the news will further heighten tension in the Middle East cauldron, providing evidence that Iraq is embarked on a massive arms rebuilding programme.

REUTERS reported the IRAQI NEWS AGENCY INA, monitored in London, as denying the equipment was for military purposes and calling the customs claims "baseless and sheer lies". INA quoted a "senior Iraqi source" as saying the hardware discovered in the crates was steel pipes for a petrochemical project. Potentially, such a monster gun would be capable of firing one-metre calibre chemical or nuclear shells as far as the Israeli capital Tel Aviv. But according to some arms experts it is more likely to be used to give missiles, armed with conventional, chemical or nuclear warheads, greater range by launching them into the stratosphere.

A customs spokesman said: "We are considering the possibility that the gun was made to order in Britain for the Iraqis.

The boxes were due to be shipped to Iraq on board the Bermuda-registered MV Gur Mariner, on charter to the Iraqi Maritime Organisation. A customs official stressed there was no connection with investigations into the discovery at Heathrow two weeks ago of 40 nuclear trigger devices bound for Iraq. [passage omitted]

Yesterday's discovery confirms concerns in Europe and the United States that Iraq is close to developing a nuclear capability. Exports of arms and defense equipment to Iraq are banned under an international agreement. Iraq has invested heavily in the development of ballistic missiles, largely based on the design of the Soviet-manufactured Scud-B. [passage omitted]

Pipes or Gun?

LD1204181890 London PRESS ASSOCIATION
in English 1712 GMT 12 Apr 90

[By Grania Langdon-Down, PRESS ASSOCIATION]

[Text] Defence experts tonight confirmed cylinders due to be shipped to Iraq as oil piping could have been used as the barrel of a huge artillery gun. The Sheffield Forgemasters company, which insisted it had Department of Trade clearance to manufacture the export

order, said the sections intercepted by customs on the quayside were in fact parts of a pipe destined for Iraq's petrochemical industry. But customs officials believe the sections—packed into eight crates, and held at Middlesbrough docks on Teesside on Wednesday—form a monster 40-metre, 14-ton barrel for what would be the world's biggest gun.

Some defence experts feared such a weapon could have been used to fire a massive shell containing a chemical or nuclear warhead. Customs chief investigation officer Mr Douglas Tweddle said: "There is no question that it could be used as a barrel of a large artillery gun to fire a projectile of some considerable size. The goods have now been seized and investigations are now continuing to prove it was intended to be used as a gun barrel and to establish whether offences have been committed."

He said the Ministry of Defence experts had concluded their examination of the equipment seized on Wednesday. "We are now satisfied that this equipment is covered by the munitions list to the export of goods control order 1989. It is definitely subject to export licensing controls."

A spokeswoman for Sheffield Forgemasters, who refused to comment on the customs statement, said: "The management are in crisis meetings at the moment."

The discovery will feature in the talks between Mrs Thatcher and President Bush tomorrow in Bermuda. Both are alarmed at the prospect of such a volatile regime as Iraq possessing a nuclear capability. They fear it could have incalculable effects on the fragile stability of the Middle East and would indeed send jitters right round the world. But in Iraq, President Saddam Husayn today told US senators he was prepared to dismantle all weapons of mass destruction if Israel would do the same, REUTER quoted foreign minister Tariq Aziz.

Husayn announced on April 2 that Iraq had binary chemical weapons, the modern form of poison gas, and threatened to "let our fire eat half of Israel if it tries to wage anything against Iraq". Western and Israeli fears that Iraq was also developing atomic arms were spurred last month by American and British accusations it tried to buy electronic devices which could be used as triggers for nuclear weapons.

A customs spokesman said the piping would now be moved to a safe place where it would be kept as evidence and officers would begin interviewing people involved.

No immediate arrests were expected.

Sheffield Forgemasters earlier issued a statement protesting about the allegations that the tubes were armaments. But in an interview quoted in Sheffield's evening newspaper THE STAR, Mr Phillip Wright, 49, the company's chief executive, said: "If this thing is part of a gun, then we, the DTI [Department of Trade and Industry] and many other people have been victims of the biggest con job in the history of arms manufacture. It

sounds to me like something out of a sci-fi fantasy." Mr Wright added: "I do not believe it is part of an enormous gun, we have done everything above board, legitimately and with full clearance from the DTI. One of our subsidiary companies does manufacture weapons, they are normally artillery, the biggest is 140 millimetres and they are clearly recognisable as guns. There is no precedent anywhere for a gun of the size they are talking about. It's mind boggling to even consider. We had received requests from Iraq in the past to supply weapons and turned them down flat. It is like something out of a best seller to now suggest we have been conned into producing the barrel of a giant gun." Mr Wright added: "If they did manage to get all the other necessary components I wouldn't stand within a mile of the thing if they tried to fire it. It would blow itself to pieces."

The Iraqi ambassador in London, Dr 'Azmi Shafiq al-Salihi, said his country denied "categorically" that the tubes were part of a giant gun. "You could use anything for a gun barrel. We ordered this for petrochemical purposes and we highly doubt any allegation of this nature. We have so many of these pipes from England and so many deals, all openly done by telexes. We don't deal with our trade and commercial relations illegally at

all." He said the seizure was "just another ring in the chain" of political and media campaign against Iraq. He asked why the company had accepted the order and why the Department of Trade and Industry had licenced it for export if it had been for use as a gun barrel. "Do you believe that Iraq can buy from England a gun barrel after this huge campaign against my country? Could we dare to buy weapons or something used to make weapons after the campaign waged against us?"

Mr George Mccord, a union representative at the Sheffield-based company, said: "From the outset these pipes never looked like anything except tubes."

He said the consignment was the last in a batch of 70, 20-foot long sections which if bolted together, would stretch 1,400 feet—almost a quarter of a mile.

Miss Alex Finlay, public relations manager for the Tees and Hartlepool Port Authority, said the cargo ship the "Gur Mariner," which was to have exported the tubes, was due to sail on Tuesday or Wednesday of next week.

Mr Michael Mates, Tory MP for Hampshire East, said: "I think the customs are to be congratulated. The customs are being very vigilant and quite rightly so."

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